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Tsutsugamushi Disease (Scrub Typhus, Mite-borne Typhus) in New Guinea*

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THE Japanese were driven out or destroyed in the vicinity of Buna and Gona, New Guinea, in November and December of 1942. This area then became a base for the operations as the fighting progressed up the coast to Wau, Salamana, Lae, Finschaven, the Markham River valley, and the Ramu River valley toward Madang during 1943. As new units moved in, the casualties from disease mounted. The principal cause of disability was, of course, malaria. Secondary to this, but more disturbing, was a typhus-like disease with which the Army Medical Corps had had no previous experience. Before the war it had been described under the name "scrub typhus" as occurring in North Queensland and as "endemic typhus" in New Guinea. By the end of the summer of 1943 there had been more than a thousand admissions for this cause to the Australian Army Hospitals and an equivalent number to the U. S. Army Hospitals. Throughout the subsequent operations "scrub typhus" has been a far more important problem to military forces in the southwest Pacific than has the classical and better known epidemic —or louse-borne—typhus to the forces in the Mediterranean and European theaters.

As a result of a request from the Commanding General, S.W.P.A., in August, 1943, the Surgeon General of the Army authorized the formation of a special commission to investigate "scrub typhus" in New Guinea under the auspices of the United States of America Typhus Commission and the Board for the Investigation and Control of Influenza and Other Epidemic Dis-

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This is a summary account of investigations which were carried out under the auspices of the United States of America Typhus Commission, War Department, and the Board for the Investigation and Control of Influenza and other Epidemic Diseases, Preventive Medicine Service, Office of the Surgeon General, U. S. Army, Washington, D. C.

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eases. This Commission left the United States in the latter part of September and established a field laboratory on the north coast of New Guinea near Buna adjacent to the Third Medical Laboratory. The first phase of the field studies was completed in December, 1943. Four members of the Commission returned to the United States, bringing several strains of the causative agent of "scrub typhus" in inoculated white mice. Laboratory studies were continued in the Division of Virus and Rickettsial Diseases of the Army Medical School. It is proposed here to present a summary of this first phase of the investigation. A detailed report is in process of publication elsewhere.[1] The field studies were continued by Kohls, Armbrust, Irons, and Philip.[2]

The objective of the Commission was to contribute to knowledge of "scrub typhus" in New Guinea with regard to (1) its relation to other typhus-like fevers encountered in this part of the world, (2) its clinical course, differential diagnosis, pathogenesis, and rational therapy, (3) its specific etiology, (4) the circumstances under which exposure to infection occurred, together with the identity of the vector and the reservoir host, and (5) its prevention through reduction in exposure or through artificial immunization or both. In this undertaking there was available, scattered through medical literature, a considerable amount of pertinent information, and the Commission had the advantage of experience already gained by officers serving in this area, much of which has since then appeared in published form.[3–10]

REVIEW

From a critical review of the literature which appeared before the war, it appeared that the disease commonly known as tsutsugamushi (kedani, flood or river fever) by the Japanese was not limited in its occurrence to certain river valleys of Honshu and parts of Formosa and the Pescadores, where it had been extensively studied by the Japanese. Under many different names,[11] such as "tropical typhus," "rural typhus," "Indian tick typhus," "mite fever," and "scrub typhus," a typhus-like disease—similar to, if not identical with, tsutsugamushi—was described in localities scattered throughout southeastern Asia and the adjacent islands in the Indian Ocean and southwest Pacific, and in the coastal area of North Queensland, Australia.

A fundamental differentiation was introduced in 1929 by the studies of Fletcher, Lesslar, and Lewthwaite[12] in the Federated Malay States. These investigators found that sera from patients who had the "urban" form of typhus in that country exhibited a positive Weil-Felix reaction with the ordinary indologenic strains of Proteus X_{19}. On the basis of clinical course, epidemiology and laboratory observations, they concluded that they were dealing with the murine flea-borne typhus which is endemic in the southeastern United States. On the other hand, sera from patients who had the "rural" form of typhus were consistently negative with Proteus OX_{19}, but became positive with an indologenic strain of Proteus named after Dr. A. N. Kingsbury, OXK. It was further recognized that the epidemiology of this rural form of tropical typhus was similar to that of tsutsugamushi disease in Japan. Since the Japanese had regarded the presence of a primary lesion or eschar at the site of the infective mite bite as pathognomonic and had reported a high case fatality rate as clinically characteristic, Fletcher and his associates in the Federated Malay States divided the cases of rural or "K" typhus into two groups—one with the eschar being recognized as probably identical with tsutsugamushi disease, and the other, without the eschar and with a low fatality rate, as

being "scrub typhus." They were followed in this differentiation by the Dutch investigators in Sumatra. Ultimately, Lewthwaite and Savoor [13] and Kouwenaar and Wolff [14] concluded that an etiological differentiation between the two clinical syndromes was not justified. Experimental inoculation of susceptible animals proved that both were due to the same agent, identical with [13] or closely related to [14] *Rickettsia orientalis* (Nagayo, et al., 1930) which the Japanese investigators had established as the specific cause of tsutsugamushi disease.

In reports from different geographic areas there appears to be some variation in the clinical manifestations of this rickettsial disease, particularly with regard to the frequency with which the primary lesion, or eschar, is found and with regard to severity or case fatality rate. These variations are no greater than those which have been observed in Rocky Mountain spotted fever or classical louse-borne typhus as they have prevailed at different times and in different places. Although a crucial test has not been made of the cross-immunity afforded by strains originating from patients with tsutsugamushi disease on the Island of Honshu in Japan, and strains originating from patients with "scrub typhus" or "mite fever" in the infected localities of southeast Asia or the southwest Pacific, there is no valid evidence at present available which justifies belief in specific etiological difference. On the contrary, all the differences which were observed could readily be explained as due to variation in strains of *R. orientalis* or variation in specific host relationships, with reference to mite species, rodent species, and the characteristics of human races which are exposed.

Japanese investigators proved, by extensive experiments with animals, that the vector of tsutsugamushi disease in Japan, Formosa, the Pescadores Islands and possibly other areas, is a mite like our "chigger" or "red bug," specifically named *Trombicula akamushi*. Considerable evidence has been advanced to incriminate a closely related form, *T. deliensis*, in Sumatra, Federated Malay States, India, and Queensland, Australia. Up to the present the crucial proof afforded by recovering *R. orientalis* in experimental animals from specimens of *T. deliensis* has not been offered, although a suggestive result was obtained in one experiment with a gibbon by Walch and Keukenschrijver.[15] Other species of mites have been suspected by various investigators.[16]

In Japan *T. akamushi* is parasitic, during the larval stage, upon a field vole, *Microtus montebelloi*. This rodent has been found to be naturally infected with *R. orientalis*. The distribution, numbers, and habits of these voles are consistent with the hypothesis that they serve as the principal reservoir host on Honshu. In the Federated Malay States a wild rat (species undetermined), which is numerous in the infected localities, has been found infected in nature. Other species of rats and bandicoots have been suspected of being implicated in the maintenance of the disease in various geographic areas, but up to the present no other animal host has been definitely incriminated by recovery of *R. orientalis* from the tissues of captured specimens.

The developmental cycle of the mite vector of tsutsugamushi disease, *T. akamushi*, was worked out by Japanese investigators. The minute yellowish red, barely visible, unfed, six-legged larval form lives in the upper layers of the soil. Under favorable conditions of temperature and moisture, it crawls about, climbing on blades of grass a few inches above the ground, seeking contact with a warm-blooded animal. If successful in this search, it makes its way over the skin of the animal until it finds a favorable site of attachment. Its

chelicerae are inserted into the skin. Food is obtained through a tubular structure, variously called the "hypostome," "stylostome," "rostral tube," or "sucking tube," which is thought to be formed as a result of the reaction of the secretions of the mite with the host tissue.[17] Two to 5 days are required for engorgement with serum. After feeding, the larva drops off and subsequent development takes place in the ground. It does not seek another host feeding, but in 1 to 3 weeks a gradual metamorphosis takes place and an octopod nymph emerges. It is neither parasitic nor predacious, apparently feeding upon plant juices. When the nymph has grown to a certain length, it seeks shelter in the earth, and pupation takes place. The emerging imago is free-living in the upper layers of the soil. In Japan the winter is passed mostly in the adult stage. In late May of the following year mature forms deposit their eggs in the soil. In June, when the mean daily temperature reaches about 20° C., the larvae begin to emerge, reach maximum numbers in mid-summer, and largely disappear in October. Thus, in Japan the distribution of the larvae of *T. akamushi* corresponds seasonably with the occurrence of tsutsugamushi disease. In more tropical climates where conditions of temperature and moisture are more uniform, larvae may be active throughout the year.

Although the Japanese investigators did not succeed in carrying mites through a complete cycle of development under laboratory conditions, they were able to prove that the causative agent of tsutsugamushi disease could be recovered from free-living nymphs and adults as well as from larvae reared in the laboratory Since the mite feeds on an animal host only once in its life cycle, it follows that the rickettsial infection which it acquires in its meal of serum must pass through the complete cycle of development from the larval form of one stage to the larval form of the next generation before it can be passed on to another animal or to man.

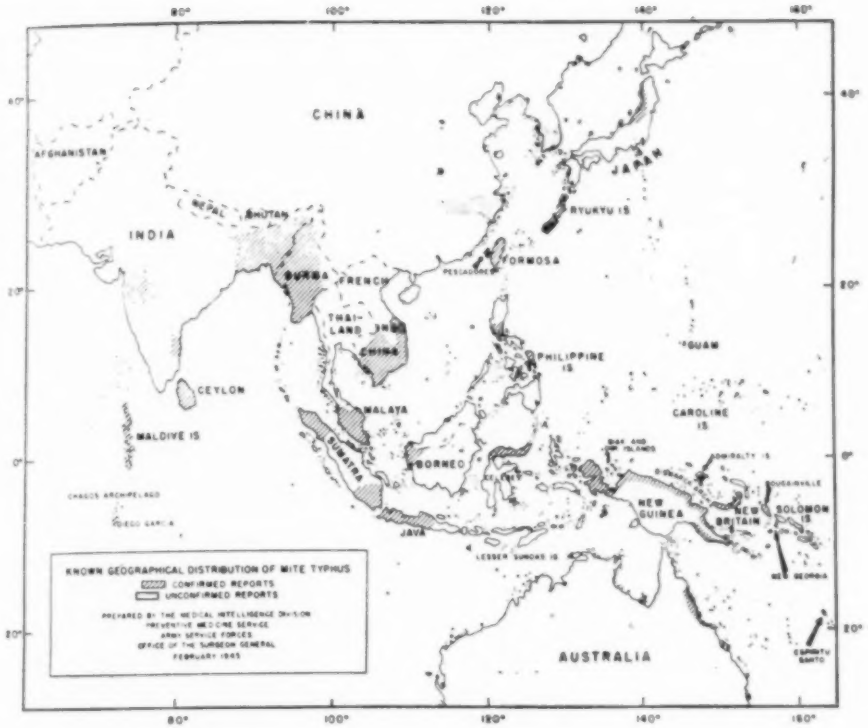
From the reports in medical literature and from the military reports since the beginning of the war with Japan, data have been assembled by the Medical Intelligence Division of the Preventive Medicine Service of the Office of the Surgeon General, U. S. Army, which are the basis for the accompanying map, indicating the geographic distribution of tsutsugamushi disease and related typhus-like fevers.

CLINICAL OBSERVATIONS

The Dobadura area in which the studies of the Commission were conducted is roughly triangular in shape on the northeast coast of New Guinea, outlined by lines connecting Oro Bay and Buna with a native village called Inonda, about twenty miles inland on the Samboga River. At the time of these observations it was being used as a supply and staging area. Exposed to risk of infection with "scrub typhus" were the combat troops, the supply organizations, and the air force moving into or through this locality. Through the courtesy of the base surgeon and of the respective commanding officers, the Commission was supplied with reports of all of the patients on whom the final diagnosis of "scrub typhus" was made in the four hospitals serving these forces between August 1 and December 1, 1943.

The Commission made an intensive clinical and laboratory study of a series of cases admitted to Station Hospital No. 363. For present purposes these observations may be briefly summarized. The course of the disease as observed in New Guinea corresponded in all essential particulars to that described for tsutsugamushi disease by the Japanese.

The characteristic early symptoms



and physical signs at onset and during the first 5 to 7 days of the disease were headache, apathy and general malaise, fever, relative bradycardia, anorexia, conjunctival congestions, lymphadenitis, often regional, and an eschar. Although the nature of the illness was frequently suspected from the general symptoms and physical signs, together with a normal or low leukocyte count, it was often possible to establish the diagnosis upon admission to the hospital by the presence of a typical eschar.

Commonly between the 5th and 8th days a characteristic macular or maculopapular rash appeared on the trunk and spread to the extremities. Although the development of a rash tended to confirm the suspected diagnosis, rashes sufficiently similar to that of mite typhus to cause confusion may at times occur in dengue and other infections.

The subsequent course of tsutsugamushi disease after the 1st week was relatively mild, with no recognizable evidence of the more serious aspects of the disease, and a total febrile period of 12 to 14 days; or moderately severe with signs of pneumonitis and encephalitis and recovery by lysis early in the 3rd week; or severe to extremely severe with febrile course of approximately 3 weeks' duration. In these severe cases evidence of peripheral circulatory collapse was common and signs of myocarditis sometimes appeared. Hepatitis and nephritis are reported as complications. Thromboses and cerebral or gastrointestinal hemorrhage may take place.

Laboratory studies confirmed the already known fact that the Weil-Felix test became positive for Proteus OXK about the 12th to 14th day of the disease in the majority of cases but that

not all patients develop agglutinins for this organism in a diagnostic titer of 1 in 160 or higher.

Rational treatment seemed to require primarily complete bed rest, good nursing care, adequate diet, fluid and salt intake, and the judicious and selective use of symptomatic drug, supportive and oxygen therapy only when specifically indicated. Penicillin was ineffective.

No special study of the pathology was made by the Commission since this aspect of the disease had already been fully and accurately described by others.[6, 8, 3] In two fatal cases which occurred in the series observed at Station Hospital 363, characteristic histopathology was found. The process was basically a disseminated focal vasculitis, and perivasculitis with conspicuous involvement of the vessels of the skin, lungs, heart, and brain.

During the period of the Commission's study in the Dobadura area there were only 6 deaths in 248 cases, a fatality rate of about 2.5 per cent. The Australian Army estimated its overall case fatality rate from this cause to be about 6 per cent. In small outbreaks the proportionate number of deaths was frequently higher. Although the disease on the whole appeared to be somewhat milder than that described by the Japanese, it must be borne in mind that the group exposed to risk in New Guinea at this time were selected healthy young men, promptly hospitalized and given good medical care.

ETIOLOGY

One of the principal objectives of the Commission's studies was to determine whether the etiologic agent of so-called "scrub typhus" in New Guinea was identical with *R. orientalis*, the cause of tsutsugamushi disease. Nine rickettsial strains were recovered by inoculation of Swiss mice with blood obtained from patients early in the course of the disease. These 9 strains of human origin were carried through at least 9 serial passages in mice, by the intraperitoneal route (with the exception of one which was carried through only 5 passages). Throughout these passages the incubation period, symptoms, post-mortem findings, and microscopical demonstration of rickettsiae were similar for each strain and corresponded to the descriptions of Dinger [18] and Wolff and Kouwenaar [19] for strains of "scrub typhus" or "mite fever" isolated in the Dutch East Indies. The inoculation of mice resulted in typical infections with ascites and death. Rickettsiae were demonstrated which, in morphology, distribution, and staining characteristics, were apparently identical with *R. orientalis* Nagayo, et al.[20] Moreover, the experimental infection of rabbits by the intraocular route with material from 6 of these strains produced an ocular inflammation which has been shown to be specific for *R. orientalis* by the work of Nagayo, et al.[20, 21] and Lewthwaite and Savoor.[22, 23] The Syrian hamster was shown to be susceptible to the intraperitoneal inoculation with these rickettsial strains of human origin, and five strains were successfully cultured in the yolk-sac membrane of the developing chick embryo. So far as could be ascertained by these methods, therefore, the species of rickettsia causing "scrub typhus" in New Guinea was identical with the causative agent of tsutsugamushi disease in Japan.

EPIDEMIOLOGY

The epidemiological features of "scrub typhus" in the military forces operating in Papua, New Guinea, were analogous to those described for tsutsugamushi disease in Japan, the Federated Malay States, Sumatra, North Queensland, and other endemic areas. An analysis of the occurrence of cases among American forces in the Dobadura area on the northeast coast of New Guinea indicated that, while the disease was contracted in widely scattered

localities, some were more dangerous than others. It also indicated that the exposure to infection was associated with activities which brought men into intimate contact with field conditions such as those which prevail in bivouacs or in establishing camps. During the period of the study the environments in which human infections were known to have originated were kunai grass fields, in which natural conditions were undisturbed at the time of occupation. From the time-distribution of onsets of cases of the disease it was clear that maximum risk was experienced during the first week or two following arrival of a unit in a new area. This risk decreased progressively so that after the 4th or 5th week the incidence became sporadic or ceased entirely, and the site could be occupied with impunity thereafter.

Decline in the attack rate could not be explained as due to the accumulation of immune individuals. It therefore was probable that it was due to decreased exposure to bites of some species of larval mites that served as vectors. Decrease in exposure was correlated with progressive changes produced by development and use of the camp site. Evidently the conditions thus created were unfavorable to continued activity and survival of the vector species.

In attempting to identify this vector species, collections of larval mites were made not only in localities where cases had originated and extensive environmental changes taken place, but also in localities where the environment appeared to be similar but where the natural conditions remained undisturbed.

Two methods were used, boot-collections of unfed larvae and collections of larvae found attached to the small mammals captured in the area. It was to be expected that the vector species would be found among those species received both in boot-collections and from animals which might serve as a reservoir host of the infective agent. In view of previous work, attention was directed particularly to collections from bandicoots and rats. These animals were present in large numbers and widely distributed throughout the area.

Sixteen species of mites were represented in the collections. Of these 3 were known to attack man and produce "scrub itch." These were *Trombidium buloloensis*, *Schöngastia blestowei* and *Schöngastia pusilla*.* Although they were abundant and widely distributed, it seemed quite unlikely that they served as vectors. They continued to be present in considerable numbers in infected localities after the incidence of cases had become sporadic or ceased altogether. There was no correlation between the incidence of "scrub itch" and that of tsutsugamushi disease. Patients gave no history of itching at the site of the specific primary lesion or eschar. The primary lesions or eschars were found on various parts of the body, while the lesions of "scrub itch" were characteristically distributed on the ankles, legs, and, to a lesser extent, on the lower trunk. Finally, it is significant that two of these species were found only in small numbers and infrequently on bandicoots and rats, and the third (*S. pusilla*) was not encountered on these hosts at all.

Of the remaining 13 species, 10 can be dismissed because they were either rare or absent in boot-collections, or were not found on rats or bandicoots. The remaining 3 deserve special consideration, namely, *T. deliensis*, *T.*

* Specimens were identified quite largely on the basis of the papers "The trombiculinae (acarina) or itch-mites of the Austro-Malayan and Oriental Regions" by Womersley and Heaslip[24] (1943), and "Notes on and additions to the trombiculinae and Leeuwenhoekinnae (acarina) of Australia and New Guinea" by Womersley[25] (1944). In these two papers 33 species are recorded for New Guinea, a few of which may be regarded as of tentative rather than of established validity and are still under consideration by Womersley and others. This applies to the species *Trombicula walchi* and *Trombicula fletcheri*, to which reference will be made later.

walchi and *T. fletcheri*. The first two species are very closely related and all are allied to *T. akamushi*, known to be the vector of tsutsugamushi disease in Japan. *T. deliensis* is mentioned first only because it has been thought to be the vector in Sumatra, Federated Malay States, India, and Australia. This species was found only in one restricted locality which happened to be a focus in which there was a high incidence of the disease. It was not taken in boot-collections and was found only on 3 of 55 rats examined in the Dobadura area. Because of its apparently restricted distribution, it seems quite unlikely that *T. deliensis* was an important vector in this part of New Guinea.

While *T. walchi* occurred sparingly, *T. fletcheri* far exceeded in frequency and numbers all other species on rats and bandicoots. That troops were exposed to attack by both species was indicated by the boot-collection of unfed larvae in the type of environment associated with the risk of infection and in certain known infected localities. In one infected locality where mites were scarce these were the most numerous species and no scrub itch mites were found. The scarcity of *T. walchi* and *T. fletcheri* in boot-collections as compared with "scrub-itch" mites suggested that man is attacked infrequently by these two species. Nevertheless, the observations made are consistent with the hypothesis that either *T. fletcheri* or *T. walchi* or both may serve as vectors in this area. Furthermore, by mouse inoculation *Rickettsia orientalis* was recovered from two pools of mites (*T. fletcheri*) collected from two bandicoots. Brain tissue from these same animals, injected into white mice, failed to produce a rickettsial infection. In view of this negative result and the fact that generation-to-generation transfer of *R. orientalis* occurs in mites, the evidence does not incriminate the bandicoot as a reservoir host. The mites may have been infected in a previous generation on another host species.

Other arthropod ectoparasites, in addition to trombiculid mites, were considered but there was no evidence to suggest that they were involved in the transmission of the disease in this area. Although ticks were found on bandicoots and occasionally on rats, there were no reports of the species here represented having been found on man.

Investigation to establish further the identity of the vector species of mites and the animal reservoir in the Dobadura area were continued by Kohls, Armbrust, Irons, and Philip, and are the subject of a subsequent report.[2]

PREVENTION

The vaccine made from suspensions of *R. prowazeki* used in the prevention of epidemic (louse-borne) typhus confers no immunity against scrub typhus (tsutsugamushi disease). Studies are in progress exploring the possibility of developing an effective method of immunization against *R. orientalis*. Up to the present time these efforts have been unproductive.

Prevention must, therefore, depend upon measures directed toward reducing the risk of exposure to mites. In staging and supply areas it is possible to take reasonable precautions. Locations which are to be used as new camp sites can be prepared as fully as possible before the arrival of a new unit, employing native labor whenever it is available. All grass and scrub should be cut level with the ground, and, after drying, collected and burned, or hauled away. It is highly desirable to burn over the camp area with a power oil sprayer or flame thrower. Underbrush in adjacent jungle strips should be cleared out in a similar manner. Sleeping on the ground should be avoided; so far as practicable cots should be used. Where facilities are available, troops should be instructed to

bathe with thorough soaping and scrubbing of the skin with a rough cloth.

Protection under field and combat conditions is a more difficult matter. Dependence must be placed upon impregnation of uniforms and socks with effective anti-mite fluids such as dimethyl or dibutyl phthalate. The impregnation may be done by hand application. A better distribution and more permanent effect is obtained by immersing the clothing in a mixture of the repellent and soap after washing. Impregnated in this manner, the protective value is slowly lost in the course of a week or two provided the antimite fluid is not washed out by rain or wading through streams. Trouser legs should be tucked inside the socks and high boots worn.

SUMMARY

The studies of the Commission confirmed the hypothesis that the "endemic" or "scrub" typhus in New Guinea is indistinguishable from the tsutsugamushi disease of the Japanese islands, southeastern Asia, and the adjacent island archipelagoes. Its clinical course has been fully described by many observers. Serologically, it is distinguished by a Weil-Felix reaction which is positive with Proteus OXK. Pathologically, it is characterized by a disseminated focal vasculitis and perivasculitis which involves particularly the vessels of the skin, lungs, heart, and brain. There is no specific therapy. Treatment is symptomatic and supportive. The case fatality rate was relatively low in the healthy young soldiers who were attacked in this area. The etiologic agent was identified as *R. orientalis*. Epidemiological evidence regarding the conditions under which infection took place was consistent with transmission through the bite of a mite. It was demonstrated that *T. fletcheri* Womersley and Heaslip 1943 could be an effective vector in this locality, and *R. orientalis* was actually recovered from two pools of mites, which consisted almost exclusively of *T. fletcheri* collected from bandicoots. This species of mite in the larval stage is parasitic upon wild rats and bandicoots, which are numerous in the endemic areas. Investigations to establish the animal reservoir are being continued. Prevention of the disease depends upon reducing exposure to mite bites and measures directed toward this end have been instituted.

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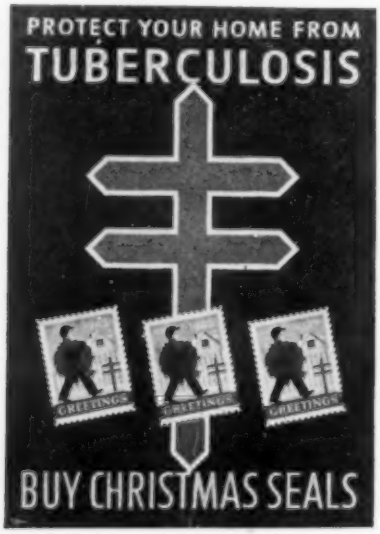

Pulmonary Calcification in Negative Reactors to Tuberculin

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FOR a number of years one of the unsolved clinical problems in tuberculosis control has been the question of calcification in the chests of persons who do not react to tuberculin. It is the purpose of this paper to present data which may resolve some of the discussion which has taken place around this controversy and to add information to the support of the views that the calcium deposits are secondary to some other infection.

REVIEW OF THE LITERATURE

It is commonly assumed, at least by pediatricians,[1] that only in the very exceptional case will a person who has been previously infected with tuberculosis fail to react to 1 mg. of O.T. These exceptional cases include some far advanced, overwhelming infections, such as miliary tuberculosis or tuberculous meningitis in its terminal stage. Certain other infections, such as measles, seem temporarily to suppress tuberculin allergy. The occasional case of lost sensitivity or anergy is also well recognized as is the recently infected subject who has not developed his sensitivity or is preallergic.

Some doubt as to the validity of this assumption began to appear as early as 1926 and 1929 when studies by Opie [2, 3] and his associates revealed an appreciable number of children who failed to react to 1 mg. of O.T. and who had demonstrable x-ray lesions in their chests interpreted as tuberculosis.

In 1931 Barnard, Amberson and Loew [4] found that, of a group of 184 adolescent children who had demonstrable x-ray lesions which could be interpreted as tuberculous, 6 per cent failed to react to tuberculin.

That an even more unique situation existed in some sections of the southeastern states was first reported by Crabtree, Hickerson, and Hickerson [5] who in 1933 reported the study of a group of Negroes over 4 years of age who were negative to tuberculin. Seventeen per cent of them were found to have calcified lesions in their chests by x-ray examination.

Nelson, Mitchell, and Brown [6] (1937), from Cincinnati, found calcifications by x-ray in 43.5 per cent of 27 children who did not react to 0.005 mg. of P.P.D. or to 1.0 mg. of O.T.

Although Crabtree had found a large number of Tennessee children with calcifications who did not react to tuberculin, Gass [7] and his coworkers in 1938 were first to show conclusively that an unusual and confusing situation existed in Middle Tennessee. They carried out tuberculin sensitivity tests and examined chest roentgenograms on 1,015 white children and 276 colored children. Of the white children, 44.5 per cent were positive to 1.0 mg. of O.T., while 51.8 per cent of the colored children gave a positive reaction. Definite calcified lesions occurred among white children in 48.1 per cent of the negative reactors to tuberculin and in

51.1 per cent of the positive reactors. The same relationship was found for the Negro children.

It was recognized by these workers that this was not in agreement with the generally accepted ideas on tuberculin allergy in relation to tuberculous infections as revealed by roentgenograms and further confirmation of their interpretations was sought. Chest roentgenograms of 154 white children from this study were sent to four independent specialists in the tuberculosis field. They were asked to read the films for presence or absence of evidence indicating tuberculous infection. These observers had no knowledge of the result of the tuberculin tests. There was remarkable agreement among these specialists that in 24.7 per cent of the children who were negative to 1.0 mg. of O.T., there was definite evidence of calcification or what were thought to be tuberculous lesions. Gass and his associates stated, "This would appear to confirm the observation on the part of the clinicians in this area that evidence of tuberculous infection is present in a considerable proportion of children who do not have a positive tuberculin test."

In 1939 Crimm and Short [8] reported that 13.8 per cent of 1,384 persons living in Indiana had negative tuberculin tests but showed evidence of pulmonary calcification.

Also, in 1939 Lumsden, Dearing, and Brown [9] published a startling comparative study of two groups of children. One group was from Coffee County in southeastern Alabama, an area with a low tuberculosis rate, while the other group was from Giles County in south central Tennessee, an area with a high tuberculosis rate. In Giles County 43.2 per cent of the white school children and 25.8 per cent of the colored children, and in Coffee County, only 0.6 per cent of the white children and 1.1 per cent of the colored school children showed pulmonary calcifications. In other words, the incidence of pulmonary calcification was forty times as high in Tennessee as it was in south Alabama. Even more interesting was the fact that among the white school children in Giles County, calcifications occurred almost as frequently among those reacting negatively to tuberculin (42.7 per cent) as among the positive reactors (46.5 per cent). The same relationship held for the colored children. With the assumption that calcification of pulmonary and hilar lesions meant tuberculosis, the conclusion seemed justified that skin testing as a sole means of establishing an epidemiological index or rate of prevalence of tuberculosis in childhood populations was of questionable value or "definitely futile." In a later summary Lumsden and Dearing [10] exhaustively studied the epidemiology of this situation and concluded that their studies strongly suggest, "that some factor or set of factors of a general environmental nature, such as may derive directly from the soil" operates to explain the regional distribution of "tuberculosis morbidity" in the southeastern United States.

Following these reports, Gass [11] and his associates working in Williamson County, of middle Tennessee, studied 573 children who were tested with tuberculin and x-ray of their chests in 1937 and 1939. Three hundred and seventy-three, or approximately two-thirds of the study group, showed calcifications. These lesions occurred early in life. The majority were present on admission to school. There was no relation to the tuberculin reaction, approximately as many occurring in the negative reactors as in the positive.

Olsen, Wright, and Nolan [12] in 1941 studied this problem in Ross County, Ohio. Of 485 white children, 129, or 26.6 per cent, had demonstrable pulmonary calcifications. Tuberculin tests and x-ray examinations were completed

on 148 children under 20 years of age. Sixty-two of this group had calcified pulmonary lesions. Six of them, or 9.7 per cent, were tuberculin-positive and 56, or 90.3 per cent, were tuberculin-negative.

In 1943, Gass[13] and his associates reported the restudy of 1,167 school children from Williamson County, Tennessee, by serial roentgenograms and tuberculin testing. The serial x-ray studies over the 4 year period showed that 83 per cent of the white children and 72 per cent of the colored children studied had pulmonary calcifications. The study showed that children acquired calcifications at a very early age, and that the percentage of lesions did not increase appreciably in the older age groups. It was present almost as frequently in children 7 to 9 years of age as in older children. Many of the children who acquired calcifications during the study failed to react to tuberculin at any time.

In a recent paper Long and Stearns,[14] using Selective Service induction x-rays, showed that the geographical pattern of calcification suggested above was maintained. "High incidence (over 15 per cent) was noted in a region bounded roughly by Fort Oglethorp, Georgia; Jefferson Barracks, Missouri; Little Rock, Arkansas; and Columbus, Ohio." The calcifications in general from men in this area were not only more frequent but larger and more extensive than in the chests of men from other parts of the country. More cases of "disseminated miliary calcifications" were noted in this area. The range of calcification in the chests of inductees varied from 6 per cent in Washington to 23 per cent in Missouri, and 28 per cent in Kentucky.

In 1945, Dillon, Gass[15] and associates, reporting results of a high school tuberculosis program in Tennessee, found 5,848 white students who reacted to tuberculin and who received x-ray examination of their chests. Forty per cent of these young people were found to have calcified lesions in their lungs. In 34 counties the rate of pulmonary calcification was less than 35 per cent, but in 25 counties it was found to be 55 per cent or higher. Twenty of these counties were located in middle Tennessee, an area which includes Williamson County.

SUMMARY OF REVIEW OF LITERATURE AND COMMENTS

These studies reveal with monotonous regularity the fact that there is in certain sections of the United States a prevalence of pulmonary calcification far beyond what can be explained on the basis of tuberculosis as revealed by tuberculin testing. Except for the early reports by Opie[2, 3] and Barnard,[4] which showed a lesser prevalence of the phenomena, all reports emphasizing this discrepancy between tuberculin sensitivity and roentgenologic information generally interpreted as indicative of tuberculosis have been from studies of young people living on or adjacent to the western Appalachian plateau, or in the eastern slope of the Mississippi River basin and the bordering states of the western slope of the Mississippi River.

The prevalence of this unexplained pulmonary calcification varies from state to state within the area and even within the states, some striking differences occurring in counties within a state. The reasons for these differences remain entirely unexplained.

The accepted interpretation that pulmonary calcification is usually or generally evidence of primary or first infection type tuberculosis would need to be completely reëvaluated if it should be found that this unexplained calcification is caused by some other infection. The implications of such a finding from clinical, epidemiological, control and public health viewpoints are tremendous.

The view that tuberculin sensitivity is a stable phenomenon, as is generally accepted by most pediatricians and immunologists, and the view that pulmonary calcification is usually an indication of a pulmonary tuberculosis infection are not compatible. One of these views must be in error.

The fact that Gass [13] and his associates have been able to observe the development of calcified lesions in a number of children who did not during the period of observation show tuberculin sensitivity is strong evidence that this calcification unassociated with tuberculin sensitivity is at least in part due to some cause other than tuberculosis.

It is our purpose in reporting the following study to attempt to aid in the clarification of this interesting and controversial problem.

GENERAL AND RELATED OBSERVATIONS

In the fall of 1943 one of us took up residence in this area of frequent pulmonary calcification in tuberculin-negative reactors. He began to see many children whose chests revealed this unexplained calcification phenomenon. Having had considerable clinical experience with coccidioidomycosis of the western arid regions, it was natural for one with such experience to desire to rule out coccidioidomycosis in children who had calcifications and who were negative to tuberculin. That coccidioidomycosis produces a primary complex which goes on to calcification indistinguishable from that of tuberculosis has been shown by Cox and Smith,[16] by Aronson, Saylor, and Parr [17] and is generally recognized in areas of the West where coccidioidomycosis is endemic. When we obtained coccidioidin for the skin tests from Dr. Charles E. Smith,[19a] of Stanford University, he made the following observation:

As men from all over the United States arrived at the air fields of the San Joaquin Valley of California they were given coccidioidin tests. Many slightly positive or equivocal reactors were noted, especially in men from Missouri, Illinois, Kentucky, Tennessee, Virginia, Ohio, Indiana, and Pennsylvania. None of them gave the really vigorous reactions so frequently seen with patients from the San Joaquin Valley with coccidioidomycosis. This situation was further complicated by Emmons's discovery [18] of *Haplosporangium parvum* and the apparent cross-sensitivity between coccodioidin and antigens derived from *Haplosporangium parvum*. Animals infected with *Haplosporangium parvum* gave a slight reaction to coccidioidin and stronger to haplosporangin; animals infected by coccidioides gave a slight reaction to haplosporangin and much stronger to coccidioidin. Men infected by coccidioides in the San Joaquin Valley, according to Smith, react slightly to haplosporangin compared to that of coccidioidin. However, the men from Tennessee and Missouri when tested at the air fields in California reacted more strongly to haplosporangin than to coccidioidin. This again suggested cross-sensitivity with fungous antigens. Smith,[19] in May, 1943, and by personal communications [19a] in December, 1943, suggested that " there is a definite sharing of a common skin reactive antigen between haplosporangin and coccidioidin, and it seems very likely to me that infection (probably fungus) causes a similar situation in Tennessee regions," i.e., pulmonary calcifications. He stated, " This is the area of pulmonary calcifications in tuberculin negative persons and is also the endemic area of histoplasmosis."

Nelson,[20] who tested the children in an orphanage in Xenia, Ohio, had previously reported a high proportion of positive reactors to coccidioidin. However, the results of our own skin testing

of 125 children with coccidioidin [21] showed no significant reactions. There is no evidence clinically or pathologically that coccidioidomycosis is present in the Tennessee area. Furthermore, *Coccidioides immitis* is a fungus of dry, arid regions, terrain strikingly unlike the regions of the Appalachian plateau.

Having satisfied ourselves that coccidioidomycosis did not account for the benign calcifications seen so frequently here, it became immediately apparent that *Histoplasma capsulatum* should be investigated as a possible etiological agent.

It is not within the scope of this report to review the biological and morphological characteristics of *Histoplasma capsulatum* or the pathological and clinical features of histoplasmosis. This has been adequately done in the reviews of Meleney,[22] of Beamer, Smith, and Barnett,[23] of Hild,[24] and the recent excellent report of Parsons and Zarafonetis.[25] This infectious disease occurs in all age groups and from all reports is uniformly fatal. It can be of acute or chronic nature. No benign forms have been described. While it is of world-wide distribution, more than half of the reported cases have occurred in states which correspond to the area of benign calcification in non-tuberculin reactors discussed above. It is due to a fungus which occurs in tissues in the yeast forms and ordinarily grows on culture media in the mycelial form. Demonstration of the fungus etiology of the disease was first obtained by the epochal cultural and transmission experiments of Demonbreum [26] in this clinic. The organism produces lesions which simulate many common diseases. It produces ulceration of the mucosa and miliary lesions with caseous necrosis and granulomata which closely resemble tuberculosis. This variety of clinical manifestations makes it seem quite possible that benign forms may exist and that the clinical picture might be one such as described in coccidioidomycosis with its primary complex going on to calcification much as in tuberculosis.

In January, 1944, a 5 month old infant was brought to Vanderbilt Hospital from a rural area of Tennessee. One month before admission he developed a transient irritability, increasing pallor, and loss of weight. Fever was present and he developed a "chest cold" 8 days before admission. He developed jaundice and bled from the bowel. Physical examination revealed an acutely ill infant who was extremely pale and had hepatosplenomegaly. Examination of his peripheral blood revealed 5 gm. of hemoglobin, 1.68 million R.B.C., 56,800 W.B.C., with an essentially normal differential. An admission diagnosis of acute leukemia was made. Further examination of the blood smear, however, revealed the presence of many large mononuclear leucocytes containing groups of 2 to 20 yeast-like bodies with refractile cell borders. Similar bodies were found in the bone marrow and the diagnosis of histoplasmosis was later confirmed by cultivation of the organism from the patient's blood and bone marrow. Following the suggestions of Zarafonetis and Lindberg,[27] and those of Van Pernis, Benson, and Holinger,[28] an antigen was prepared from a filtrate of an old broth culture of *Histoplasma capsulatum*. This culture was from a prior case, classical in all respects.* An intradermal injection of 0.1 ml. of a 1:100 dilution of this antigen yielded a local reaction of several centimeters of edema and erythema. A coccidioidin test was negative, as was the tuberculin test. Similar histoplasmin † skin tests

* We are indebted to Dr. James Owens, of the Department of Pathology, for the first material we used in skin testing. He prepared the antigen for us from a culture which he was studying.

† Histoplasmin is the term we used to designate the antigen we were using for skin testing. It is to be hoped that this natural term will be used for any antigen which may be found satisfactory for the purpose of skin testing in relation to histoplasmosis.

on the mother and father were both positive. The infant died and no autopsy was obtained, but two blood cultures revealed a positive culture of *Histoplasma capsulatum* in heavy growth. One blood culture contained as many as 3,000 colonies per ml. This unpublished case is interesting because it was diagnosed ante-mortem and because it was our first experience that a human case of histoplasmosis would develop sensitivity to a skin test material made from the organism.

Following this and using the same antigen, we applied for a short period skin tests of this broth culture filtrate to all children admitted to this service, as well as to many of the house staff. The coccidioidin tests noted above were also applied at this time. After approximately 125 children had been tested with both antigens, an analysis revealed that, while only a few of the children reacted slightly or equivocally to coccidioidin, about 23 per cent of the children reacted to histoplasmin. The great majority of the 125 children tested were infants, which may account for the small number reacting to the antigen. This point will become more pertinent later. However, there were several infants under 1 year of age who had positive reactions, although no previous history of significant illness could be obtained. These routine skin tests have been continued and the results will be reported later.

As a result of our preliminary skin tests with histoplasmin it seemed apparent: (1) that either the response to the skin test was the result of previous infection with *Histoplasma capsulatum* or to infection with some other fungus having a common or closely related antigen; (2) that infection with this unknown fungus was much more common than could be explained on the basis of any clinically known fungous infection, including the fungi commonly responsible for dermatomycoses; (3) that infection with such an agent must at times be almost symptomless. The positive test in the 5 month old child with histoplasmosis was at least suggestive of some specificity. It follows, of course, that histoplasmosis might exist in benign form, and that all the people who had positive tests might have had an unrecognized infection.

Many of those routinely tested who reacted positively to histoplasmin were cases with pulmonary calcification and negative tuberculin reactions. This immediately suggested that histoplasmosis might be the etiologic cause of the unexplained benign pulmonary calcification common to this region.

Members of the pediatric staff and medical student body who have lived all their lives in Kentucky, Tennessee, and Missouri reacted strongly to the antigen, while conversely other members who had recently arrived from California, Maryland, and New York did not react. One medical student, whose home was in Missouri, had a presumably negative chest plate on induction into the Army. He was found in our preliminary studies to be negative to 1 mg. of tuberculin but extremely sensitive to histoplasmin. Two years after induction into the Army, he has been discharged because he has diffuse disseminated calcification in his chest. Although he has been continuously negative to tuberculin, he must have laid down sufficient calcium in his chest in the 2 year period to make him fall outside of standards set up by the Army. He is entirely well and leads a strenuous outdoor life besides his medical school studies.

In 1941 a well developed and nourished 10 month old male infant was admitted to Vanderbilt University Hospital. He was the only child of young healthy parents who lived in a nearby rural area. His admission was for convulsions which were subsequently proved to be due to bilateral subdural

hematomata chronic enough to have caused a hydrocephalus, head circumference 47 cm. He died from hyperpyrexia and convulsions following surgical removal of the abnormal membranes on one side, death occurring less than 12 hours after operation. Lesions compatible with subdural hematomata or hygroma were found at autopsy. There was also in each lower lobe of the lungs a small 3 to 4 mm. greyish nodule which cut with gritty resistance and which had white areas of calcification. The tracheobronchial nodes were dark red and soft, free of areas of caseation or calcification. Microscopic sections of the pulmonary nodules showed them to be composed of several giant cells with many nuclei lying among large mononuclear cells. This lesion was surrounded by small round cells and a few epithelioid cells. Stained sections failed to show tubercle bacilli. The hilar nodes showed hyperplasia. The germinal centers contained large pale cells apparently necrotic, but there were no granulomatous lesions. The liver and spleen appeared normal to gross examination, but sections showed small granulomatous lesions like those in the lung. In the liver sections there were several small lesions consisting of several large mononuclear or giant cells surrounded by small round cells. In the spleen sections there was a lesion composed of giant cells in a matrix of greyish pink amorphous material containing a few round cells surrounded by a layer of fibrous tissues. Dr. R. D. Lillie of the National Institute of Health studied tissues from this child and their laboratory was able to grow *Histoplasma capsulatum* from the hilar lymph nodes. The fact that the spinal fluid was normal and that the cultures of the subdural fluid showed no growth after 11 days of incubation would seem to exclude *H. capsulatum* as having been the cause of the cerebral lesion and of the child's death. It is possible, therefore, that this child represents a benign case of histoplasmosis.

Palmer[29] recently reported the results of skin testing 3,105 nurses in five widely distributed centers with histoplasmin,* and tuberculin. Chest roentgenograms had been made. Of the total group of 3,105 nurses tested, 294 were noted to have pulmonary calcifications. Of this group, 21.4 per cent with calcifications reacted to tuberculin, while among the remainder who had negative tuberculin tests the great majority had positive histoplasmin skin tests. Only 25, or 8.5 per cent, of the nurses with calcifications had a negative reaction to both tuberculin and histoplasmin. He found histoplasmin tests positive in 4.7 per cent of the nurses from Minneapolis, in 61.5 per cent of the Kansas City, Mo., group, and 50.2 per cent in the Kansas City, Kan., group. These areas correspond to areas of low and high prevalence of pulmonary calcification in those negative to tuberculin. Summarizing his results in a different manner, among nurses reacting only to tuberculin, 10.4 per cent show calcifications, while among those reacting only to histoplasmin 31.1 per cent show calcifications. Among those reacting to both antigens, 34.1 per cent show calcifications. Only 1.2 per cent of the group as a whole had calcifications without reacting to one or the other of the antigens. He concluded, based on this evidence, that a mild, probably subclinical form of histoplasmosis (or infection with an immunologically related organism) is responsible for a high proportion of calcifications seen in x-rays of tuberculin-negative reactors.

These studies and our own preliminary observations would seem to indicate a strong possibility that infection with *Histoplasma capsulatum* is related to the problem of non-tuberculous be-

* Palmer's antigen was a filtrate of a broth culture similar to the material we used.

nign pulmonary calcification. Further studies of this and associated problems seem to be indicated.

Of the problem related to the study of the question of histoplasmosis, the finding of a satisfactory antigen for skin testing seemed of primary importance. Our preliminary antigen represented the broth soluble elements from organisms growing in the mycelial form. While we have been able to get readable skin responses to this material, it is not an entirely satisfactory antigen. To get good responses it is necessary to use 0.001 ml. to 0.01 ml. of the original broth culture and, as the organism is relatively fastidious, this has been a meat infusion broth with its numerous extraneous antigens. These collateral antigens may, particularly in adults, detract from the specificity of the skin test. Inasmuch as the fungus seems to grow only in the yeast form in infected animals and man, it would seem that an antigen derived from the yeast phase would not only be more representative of the antigens in contact with tissues but would have the added advantage that it could be harvested almost entirely free of extraneous antigens.

Preliminary studies,[30] to be reported elsewhere, have shown that the yeast form yields a very satisfactory antigen and that the soluble surface antigen, or antigens, are as effective from the viewpoint of skin tests as are solutions of the entire disrupted organism.

Other preliminary observations on guinea pigs which received sub-lethal but infective doses of live *Histoplasma capsulatum* yeast cells show that these animals do develop skin reactions qualitatively similar to those observed in man.

While this problem is being studied, we have continued testing groups of children with the diluted filtrate of broth cultures of the mycelial form of *Histoplasma capsulatum*.

STUDY OF RESPONSES OF CHILDREN

For the first group to be studied the children from a children's home were selected because of the stability of the population, the fact that the children had lived all their lives in the State of Tennessee, and because we knew that there were among the group many who had pulmonary calcification but did not react to tuberculin. The children's home is located in Williamson County, Tennessee. The age distribution of the group is shown in Table 2. The sex distribution is approximately equal.

X-rays of the chests were made with portable equipment on 4 x 5 inch stereoscopic film and read for presence or absence of calcification by Dr. E. F. Harrison, of the Division of Tuberculosis Control, Tennessee Department of Public Health, whose experience with this technique has been extensive. Old tuberculin 0.1 mg. and a preparation of histoplasmin (0.1 ml.) * were applied intradermally. These were read in 72 hours. This time was selected because of our previous knowledge that skin test sensitivity to histoplasmin comes up sharply at 40 to 60 hours and remains present for 2 to 3 weeks. Edema surrounded by a large area of erythema is present in positive reactions. This is followed by slight desquamation as the reaction to histoplasmin subsides. Measurements were taken of both edema and induration, as well as the erythema surrounding the site of inoculation. Reactions called positive were those having a diameter of induration over 5 mm. Negative reactions had no induration or erythema. No difficulties were encountered in reading the tests. They were, with only one or two exceptions, either definitely positive or negative to anyone familiar with reading tuberculin tests.

* Histoplasmin 1:100 dilution, 0.1 ml. = to 0.001 ml. of original filtrate.

RESULTS

One hundred and eighty-one children were examined. Forty-five, or 24.9 per cent, reacted to tuberculin, 133, or 73.5 per cent, reacted to histoplasmin, and 79, or 43.6 per cent, had pulmonary lesions interpreted as calcifications. It is obvious from a study of these figures that almost twice as many children (43.6 per cent) had calcification as were tuberculin-positive (24.9 per cent). This is consistent with other studies reviewed above. Positive reactions to histoplasmin, 73.5 per cent, were three times as common as positive reactions to tuberculin. These findings are shown in Table 1.

TABLE 1

Results of Histoplasmin and Tuberculin Tests and the Presence of Pulmonary Calcification in Tennessee Children

No. Examined	Tuberculin Positive		Histoplasmin Positive		Calcifications	
	No.	Per cent	No.	Per cent	No.	Per cent
181	45	24.9	133	73.5	79	43.6

The reactions to histoplasmin were encountered in the youngest age group to the extent that 41.7 per cent of those under 5 years gave positive reactions. The per cent positive increased with each age increase to a maximum of 92.6 per cent in the children 15 to 19 years of age. These findings are shown in Table 2.

TABLE 2

Number and Percentage of Children Positive to Histoplasmin by Age Groups

Age	Number	Positive	
		Number	Per cent
Total	181	133	73.5
Under 5	12	5	41.7
5–9	55	35	63.6
10–14	87	68	78.2
15–19	27	25	92.6

None of the children under 5 years of age reacted positively to 0.1 mg. of tuberculin. The per cent positive increased thereafter with each age group to a maximum of 51.9 per cent. These observations are shown in Table 3.

TABLE 3

Number and Percentage of Children Positive to Tuberculin by Age Groups

Age	Number	Positive	
		Number	Per cent
Total	181	45	24.9
Under 5	12	..	....
5–9	55	8	14.5
10–14	87	23	26.4
15–19	27	14	51.9

The rate of appearance of calcium by age groups was intermediate between the rate observed for histoplasmin reactions and tuberculin reactions. There was a lag behind the histoplasmin reactions but the appearance rate was definitely more rapid than that of tuberculin sensitivity. These findings are shown in Table 4.

TABLE 4

Number and Per cent of Children Showing Pulmonary Calcifications by Age Groups

Age	Number in Group	Showing Calcifications	
		Number	Per cent
Total	181	79	43.6
Under 5	12	..	....
5–9	55	21	38.2
10–14	87	46	52.9
15–19	27	12	44.4

The appearance by age groups of tuberculin reactivity, histoplasmin reactivity, and the appearance of pulmonary calcifications is summarized in Chart 1.

It is apparent from this chart that reactivity to histoplasmin occurs at an earlier age than the appearance of calcium in the lungs or reactivity to tuberculin. The curves of the appear-

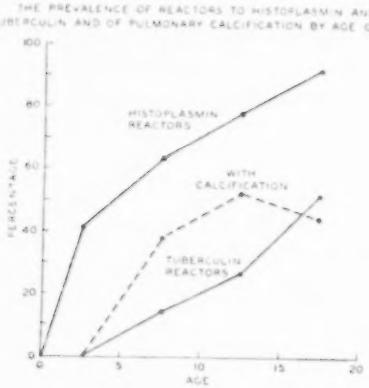


CHART 1—The Prevalence of Positive Reactions to Histoplasmin and Tuberculin and Pulmonary Calcification by Age Groups

ance of the calcium depositions and histoplasmin reactivity are parallel except in the last age group. This falling off of the prevalence of calcium in the lungs will be commented on later. The relationship in the height of the histoplasmin reaction curve and that of calcium deposition is such as would be expected if calcium was being laid down in the healing of lesions responsible for the appearance of the histoplasmin sensitivity.

There was no sex difference in reaction to histoplasmin, males showing sensitivity as frequently as females in all age groups.

Table 5 reveals the number and percentage of children with calcifications according to reaction to tuberculin and histoplasmin.

This table shows that 20, or 55.6 per cent, of 36 children who reacted both to histoplasmin and tuberculin had pulmonary calcification, that 48, or 49.5 per cent, of 97 who reacted to histoplasmin but not to tuberculin had pulmonary calcification. In the group who were positive to tuberculin but not to histoplasmin 3, or 33.3 per cent, of 9 showed pulmonary calcification. The number involved in the last category is so small that significant deductions are not warranted but they suggest that pulmonary calcification occurs less commonly in relationship to tuberculin sensitivity than in relationship to histoplasmin sensitivity. That calcification should occur most commonly in relationship to combined sensitivity to tuberculin and histoplasmin is only to be expected as there is no reason for their being exclusive.

There are, as shown by Table 5, 8 individuals who show calcification in the absence of sensitivity to either tuberculin or histoplasmin. They comprise 10 per cent of the group and are 4.4 per cent of the whole group.

These 8 individuals were further studied to see if an explanation could be found for this occurrence. Their tuberculin tests were stepped up to 1.0 mg.* This brought out clear-cut sensitivity in 3 of the cases. The chest

* The children in the group who had failed to react to 0.1 mg. of tuberculin had been retested with 1.0 mg. No other significant discrepancies were found.

TABLE 5

Number and Percentage of Tennessee Children with Calcifications According to Reaction to Tuberculin and Histoplasmin

Type of Reaction	*Number*	*Per cent of Whole Group*	*With Calcifications*	
			Number	*Per cent of Reaction Group*
Total	181	100.0	79	
Tuberculin + Histo. +	36	19.9	20	55.6
Tuberculin + Histo. —	9	5.0	3	33.3
Tuberculin — Histo. +	97	53.6	48	49.5
Tuberculin — Histo. —	39	21.5	8*	20.5

* See Table 6 corrected after restudy by Roentgenogram of chest, repeat histoplasmin and 1.0 mg tuberculin tests.

TABLE 6

Number and Percentage of Tennessee Children with Pulmonary Calcification According to Their Reaction to Tuberculin and Histoplasmin Corrected for 14 x 17 Inch X-ray Film Interpretations and Sensitivity to 1.0 mg. of Tuberculin

Type of Reaction	Number	Per cent of Whole Group	With Pulmonary Calcifications: Number	With Pulmonary Calcifications: Per cent of Reaction Group
Total	181	100.0	78	
Tuberculin + Histo. +	36	19.9	20	55.6
Tuberculin + Histo. —	12	6.6	5	41.7
Tuberculin — Histo. +	97	53.6	48	49.5
Tuberculin — Histo. —	36	19.9	5*	13.9

* The chest films showing doubtful calcification were included as positive. If the two doubtful calcifications were excluded, the per cent of the group showing calcification falls to 8.3.

roentgenograms were rechecked on 14 x 17 films and this revealed that one of the 1.0 mg. tuberculin reactors had a negative chest film. There were also 2 individuals negative to both tuberculin and histoplasmin who had doubtful calcification with the larger film. (The restudy of the group included retesting to histoplasmin with the same strength of antigen. This brought out one clear-cut positive reaction whose inclusion in the negative group must have been an observational error. This individual was accordingly placed in the histoplasmin-positive reaction group and he is included as such in the preceding tables.)

Table 6 shows the results of applying the corrections noted above.

An analysis of the 78 children with pulmonary calcification is shown in Table 7.

It may be seen from Table 7 that of 78 children with pulmonary calcification, 25, or 32 per cent, reacted to 1.0 mg. or less of tuberculin. (This corrects to 23, or 29.5 per cent, if the doubtful calcifications are excluded.) There were 53 children who did not react to tuberculin, more than twice as many as did react. Of the whole group, 68, or 87.2 per cent, reacted to histoplasmin. As a whole there were almost three times as many children reacting to histoplasmin as children reacting to tuberculin. Only 6.4 per cent of the group failed to react to either tuberculin or histoplasmin.

It appears from these figures that most of the pulmonary calcifications

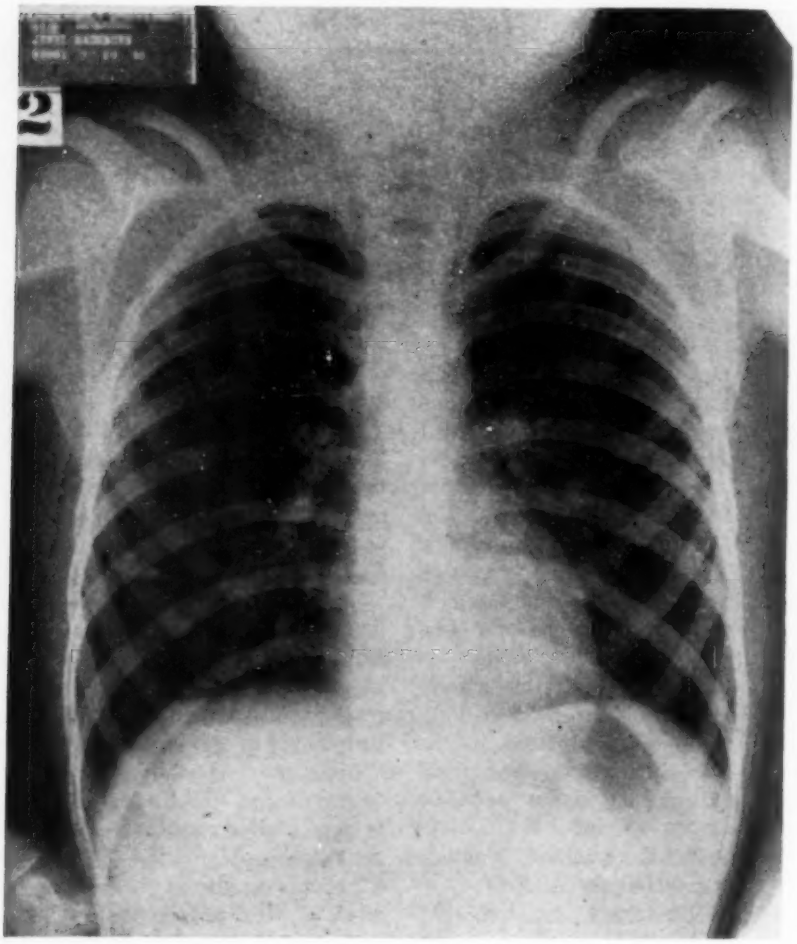
TABLE 7

Histoplasmin and Tuberculin Reactions in 78 Children with Pulmonary Calcifications

	Number	Per cent of Whole Group
Histoplasmin + Tuberculin +	20*	25.6
Histoplasmin + Tuberculin —	48	61.5
Sub-total Histoplasmin +	68	87.2
Tuberculin + Histoplasmin +	20*	25.6
Tuberculin + Histoplasmin —	5	6.4
Sub-total Tuberculin +	25	32.0
Histoplasmin — Tuberculin —	5	6.4
	5	6.4

* These groups represent the same individuals. They are included twice in the table to make the sub-total groups correct.

Plate No. 1



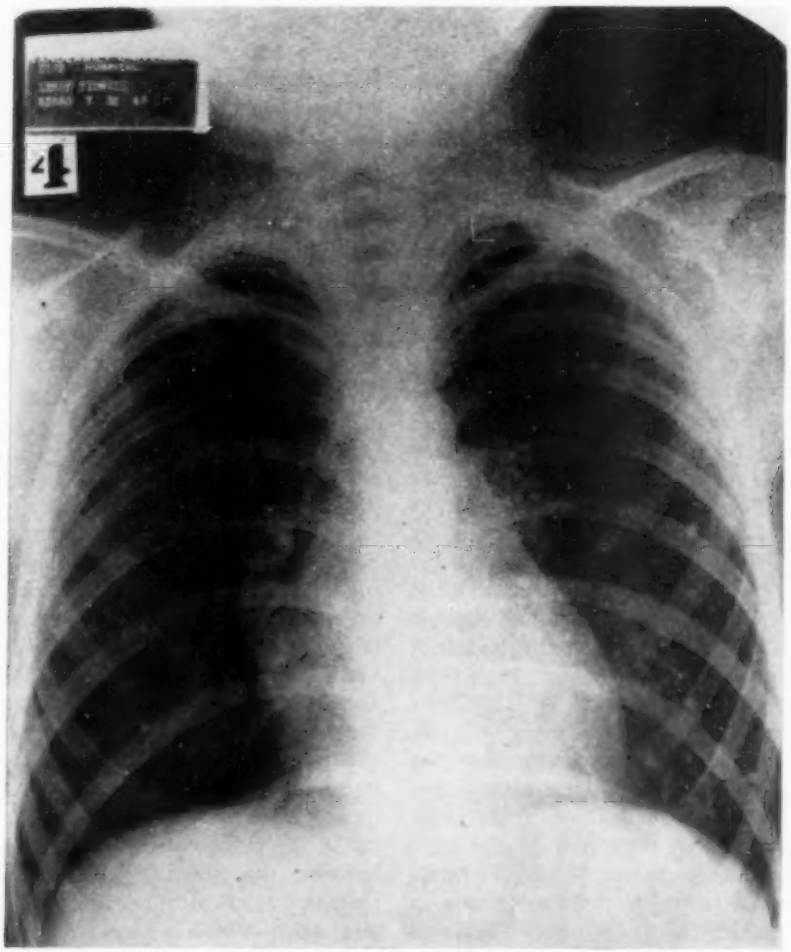
occur in individuals who react to histoplasmin. The concomitant occurrence of tuberculin sensitivity seems to increase slightly, not greatly, the probability of finding calcium deposits in the lungs.

X-RAY FINDINGS

While we do not propose at this time to analyze critically the roentgenographic manifestations of disease found in these children, there are certain points which can be mentioned.

We are not able to distinguish with any real degree of certainty the difference between the lesions found in the four reaction type groups who show pulmonary lesions. We are able to note some changes which recurred frequently. In general, one may say that the lesions found in conjunction with positive histoplasmin tests tended to be multiple. Frequently there were several bilateral peripheral foci of calcium deposition. The lesions found in those positive only to tuberculin in contrast tended to be single peripheral foci and as a rule only one lymphatic course

Plate No. 2



back to the hilar nodes was involved. Furthermore, there was less tendency for multiple hilar glands to show calcium deposition in those without histoplasmin sensitivity. Another observation was that, while there might be considerable irregularity of the calcium plaque in the tuberculin sensitive individuals, their glands did not show the discrete multiple button-like foci of calcium deposition commonly seen in those sensitive to histoplasmin. These findings are to be subjected to a detailed analysis and will be published elsewhere. Some of the differences between the tuberculin and histoplasmin sensitive individuals are illustrated by the following reproductions of the x-ray films. Plate No. 1 shows a typical example of the type lesion found in a tuberculin-sensitive, histoplasmin-negative individual. Plate No. 2 shows an example of the lesions found in a histoplasmin-positive, tuberculin-negative individual.

DISCUSSION

In the first section of this paper we

have reviewed the literature relating to the finding of pulmonary calcification, lesions usually interpreted as indicative of tuberculosis, in people who are not sensitized to tuberculin. These studies [2-17] show that, while the problem may be widespread, there is a much greater prevalence of this phenomenon in the area of the eastern slope of the Mississippi River basin and the adjacent states of the western slope south of Iowa than in the rest of this country. The prevalence of pulmonary calcification varies from place to place within states and from state to state within this area. In this general area the overall prevalence of pulmonary calcification varied from 27 per cent [12] in Ohio to 83 per cent [13] in Tennessee. Of these calcified lesions only from 10 to 50 per cent were explainable on the basis of tuberculin sensitivity. Twenty-four to 45 per cent of the children in the age groups reported showed pulmonary calcification without tuberculin allergy. These studies have been interpreted variously by different authors, but in some instances [9, 10] they have been cited as evidence that the tuberculin reaction is not a satisfactory epidemiological index of tuberculous infection, more than half of the children who had roentgenographic evidence of disease failing to react to tuberculin even at levels of 1.0 mg. That this pulmonary calcification in tuberculin insensitive children was due to some other infection has been suspected by those who see these patients, but no one has until recently been able to incriminate any specific etiological agent for this phenomenon in this section of the United States. The observations of Gass [13] and his associates on the development of pulmonary calcification while the children were under observation and its occurrence without showing tuberculin sensitivity during the period of observation is highly significant. It seems incredible that tuberculin sensitivity, a tissue sensitization, could develop and disappear with regularity in periods as short as two years. This observation offered the first substantial evidence that some infection other than tuberculosis might be the cause of this widespread, unexplained pulmonary calcification.

A pilot survey of the reactions of children in this section to coccidioidin with completely negative results enabled us to conclude with reasonable certainty that infection with *Coccidioides immitis* is not etiologically related to this problem of pulmonary calcification. There is no evidence that coccidioidomycosis occurs in Tennessee.

The preliminary skin tests to histoplasmin of children admitted to the pediatric ward of Vanderbilt University Hospital offered the first substantial suggestion that *Histoplasma capsulatum* might be of etiologic significance in this finding. This possibility was quickly brought into focus by the work of Palmer.[29] Using already accumulated information concerning the tuberculin reactions and the presence of pulmonary calcification in cadet nurses as a background, he studied their response to histoplasmin. His study shows considerable correlation between the presence of unexplained pulmonary calcification and histoplasmin sensitivity.

In the study of a group of 181 children reported here, we have found that some of the calcium deposits found in the lungs of Tennessee children are attributable to tuberculin sensitivity, as might be expected. We have also found, however, that much more of it occurs in association with sensitivity to histoplasmin. Not only is there this association between sensitivity to histoplasmin and pulmonary calcification, but the age at which sensitivity to histoplasmin develops and the age at which calcification appears are in such relationship that they might be cause and

effect, while the age at which tuberculin sensitivity appears lags far behind the deposition of calcium. Gass [13] and others have commented on the fact that these unexplained calcium deposits appear early in life. We have found that the development of histoplasmin sensitivity likewise occurs early in life.

In Chart I there appears in the last age group a divergence between the prevalence of histoplasmin and tuberculin sensitivity and the prevalence of pulmonary calcification. There is a falling off of the prevalence of calcification from the 10 to 14 year group to the 15 to 19 year group. Gass [13] and his associates have observed this phenomenon in certain groups in their studies. They have suggested that this might be due to increasing difficulty in securing good definition in the hilar areas of older subjects. Harrison [31] has also observed that there are less calcium deposits in the chests of adults in Williamson County than in their children. These findings are interpreted as indicating that some calcified lesions may be absorbed in post-adolescence and early adult life.

Any discussion of the results of a study involving skin tests inevitably brings up the question whether or not a reaction to the antigen in use is indicative of preceding infection with the organism from which the antigen was derived. With the tuberculin test, time has settled this question. There is no infection of clinical significance which gives nonspecific responses. With antigens derived from fungi, this is not true. There has already been demonstrated both in infected animals and in man crossed immunologic responses to coccidioidin and an antigen derived from *Haplosporangium parvum*, and the studies of Smith [19n] suggest that there may be a relationship between both of these antigens and some fungus responsible for sensitization of men from the area where "non-tuberculous benign pulmonary calcification" is most common.

From our limited experience we know that a proved infection with *Histoplasma capsulatum* in an infant 5 months of age led to the development of sensitivity to our antigen and to reactions qualitatively similar to those observed in contacts and the individuals here reported. We have been able to confirm the observations of others [27, 28] that antigens derived from filtrates of broth cultures elicit skin reactions in infected laboratory animals.

These observations do not, of course, prove that the association between "non-tuberculous benign pulmonary calcifications" and histoplasmin sensitivity is indicative of an etiological relationship between *Histoplasma capsulatum* and the infection which produces the lesion that leads to the calcium deposition. We are in agreement with Palmer that this may well be the result of some other fungous infection whose causative organism has an antigen common or closely related to the antigenic complex present in histoplasmin.

These observations, however, when taken in conjunction with certain known facts concerning the distribution of fatal cases [25] of histoplasmosis suggest the possible etiologic relationship between "non-tuberculous benign pulmonary calcifications" and a benign form of histoplasmosis.

That histoplasmosis has never before been reported except as a fatal infection does not preclude the possibility of benign forms occurring or even being common. Histoplasmosis may well be in a state similar to that occupied by coccidioidial granuloma before Dickson and Gifford [32] showed that benign forms of the disease were common.

Another fact concerning histoplasmin as a skin testing antigen is worthy of comment. The high prevalence of positive reactions to the antigen robs it of

much significance in relationship to clinical infection. While a negative test may be of some value in excluding the possibility of histoplasmosis, a positive test would not be significant except possibly in an infant.

The epidemiologic studies here reviewed strongly point to the assumption that much of the pulmonary calcification of this region is non-tuberculous in origin. The nature if not the exact etiological agent responsible for these lesions is suggested by the study of Palmer and that reported here. There remain to be developed techniques which will enable us readily to isolate and identify the true etiological agent and to develop other tests for demonstrating immunologic reactions, such as precipitin and complement-fixing tests. There is further need for observations on the development of skin sensitivity to histoplasmin. Careful observations in infants and young children may enable us to describe clinically the infection which precedes the development of sensitivity.

SUMMARY AND CONCLUSION

1. A chronological review of the extent and degree with which calcification occurs in the chests of persons insensitive to tuberculin has been made.

2. A pilot survey of sensitivity to coccidioidin indicated that coccidioidomycosis is not related to this problem in Tennessee.

3. We report the clinical and indirect reasons for suspecting the relationship of histoplasmosis to the problem.

4. Preliminary studies concerning the development of histoplasmin are noted.

5. A possible example of a non-fatal infection with *Histoplasma capsulatum* is reported.

6. A study of the chest roentgenograms and the skin sensitivity to histoplasmin and tuberculin of 181 children from middle Tennessee suggests an immunologic relationship between histoplasmin sensitivity and the problem of pulmonary calcification.

7. The significance of the reviewed studies in relationship to the findings of our study and the study of Palmer is discussed.

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UNRRA China Project Expands

According to an announcement from the Washington headquarters of the United Nations Relief and Rehabilitation Administration, 18 doctors, sanitary experts, and nurses have joined the staff of UNRRA in Chungking. These persons have conducted special training programs for Chinese experts and brought under control a serious cholera epidemic and begun action on requests for speedy recruitment of approximately 200 additional medical persons for field operations. The program is under the direction of Leland A. Powers, M.D., M.S.P.H., formerly the State Health Officer of Washington. The program is being developed in coöperation with Dr. P. Z. King of the Chinese National Institute of Health, Dr. Chang Wei, and Dr. Yao Ke-fang, among others.

Among the medical workers sent by UNRRA in answer to urgent requests for help in the cholera epidemic are Drs. James Watt, U.S.P.H.S., Hobart A. Reimann, Jefferson College Medical Hospital, Philadelphia, William A. Frye, Nashville, Herbert K. Abrams, Chicago, Eldred K. Musson, Chicago, Carlton B. Chapman, Boston, and W. J. Wood, former assistant chief of the Medical Services in the Canadian Army. Two sanitary engineers, Conrad P. Straub, Irvington, N. J., and Franz J. Maier, Jackson Heights, N. Y., accompanied the doctors.

Other staff recruited in the United States and already in Chungking include Sanitary Engineer Robert Burden, Cambridge, Mass., Dr. Leo Eloesser of Stanford University, Adelia L. Eggestein of Minneapolis, and Ruth Ingram, formerly of Peiping. Also included are Dr. Victor A. Sutter of El Salvador and Drs. Frederick A. Jensen formerly of Vienna, and Ernst Singer of Czechoslovakia.

According to the UNRRA announcement, it has been estimated that in the next four years China will have to train 34,000 technicians. UNRRA is attempting to fill present requests from China for 200 medical field workers and has set a recruitment goal of 100 medical men and 30 nurses by the end of the current year. Persons interested in the program should communicate with the UNRRA office, 1344 Connecticut Ave., Washington, D. C.

On Making Public Health Positions More Attractive*

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LIKE housekeeping, personnel administration is a job that is never finished. Each day recurring tasks must be performed, and periodically major readjustments are superimposed on this routine. Today, the great problem of public health organizations is that of meeting difficulties resulting from a shortage of qualified workers, both professional and nonprofessional. In many communities this shortage is so great that not even the minimum basic public health activities are being maintained.

Unfortunately, it is commonly supposed among health administrators that the termination of hostilities will automatically solve the problem; it is thought that former incumbents of public health positions will immediately return to their usual work, and that if more people are desired, they can be obtained with facility.

That there is insufficient analysis in these foregoing assumptions should be quite apparent to those familiar with public health administration. Of course, this drying up of the personnel reservoir may be attributed in large part to the war and its consequent demand for the services of the men and women of our country, but other controllable factors are involved that merit serious consideration. In the first place, qualified public health people were not available in sufficient numbers even before the declaration of war, and since then very few new ones have been developed. Again, those that have remained on the job are getting older, and many have fallen out of the ranks, further depleting already inadequate numbers. As for public health people in military service, it should not be assumed that all of them will return to their previous positions, or that many demobilized persons not formerly in public health work will choose that sphere. In this latter connection the report, "Postgraduate Wishes of Medical Officers,"[1] published in the *Journal of the American Medical Association* is informative. In brief, an analysis of questionnaires returned by 21,029 medical officers revealed that only 110 desire post-war training in public health. Not all of these represent a post-war accession to this field; actually a high proportion are thus merely indicating additional training they desire before resuming their usual work. And there is no assurance even that all of these will reënter such work.

For some time, our educational institutions cannot be of great help in meeting current personnel shortages. During the war full-length professional education of engineers and scientists had all but come to a stop. In lesser degree, the same may be said of the

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training of physicians, since under war conditions relatively few candidates were available to enter premedical courses. True, a large amount of wartime educative training has been carried on at schools and colleges in conjunction with various branches of the armed forces, but it is training directed toward the end of enabling the individual to meet particular situations of limited scope that might be expected to arise in the conduct of military operations. There is one notable exception to this general situation, and that is the training of young women for nursing. The Cadet Nurse Training Program has been a success. Largely through its operation, the number of candidates entering upon initial training throughout the country has increased from the pre-war level of about 35,000 annually to approximately 65,000. There is no question but that these nurses constitute an important post-war public health potential, but it must be observed that they are being trained through an accelerated course, and that certain studies have been reduced or eliminated, studies that, in the past, have proved to be of great value in supplying a broader background for participation in the general public health program.

So much for training, and what may be expected in the way of new public health personnel in the near future. With the exception of nurses and possibly technicians, there just won't be any, for some time. Right now there is a world-wide shortage of physicians, and no one can tell when new ones will be turned out in sufficient numbers. The prospects for engineers may be somewhat better, but they are not too bright. Additional first-class research workers are not likely to become available for some time.

A great demand from all sources for well qualified people may be expected, at least in the early years of the peace. Ours is the only great nation whose capacity to produce has remained unimpaired, and the demand for our goods will probably be world-wide. In order to meet this demand, manufacturing industries, at least for a time, will have to work at top speed. And along with a high level of activity in the factories, there may be anticipated a heavy demand for transportation, communication, and various forms of personal service. In other words, public health will be looking for personnel in a highly competitive market.

To meet this competition, public health positions must be made more attractive than they have been. It is that point in particular I wish to emphasize. But how can these jobs be made more attractive? The principal factors that determine the attractiveness of any job seem rather obvious. They are, first, financial remuneration; second, selection on merit; and third, opportunity for professional development. On these three scores, it cannot be said that public health positions have in the past invited favorable consideration, nor can it be maintained that responsible public health administrators have faced the situation frankly. Unfortunately there has prevailed the tradition not only of housing public health staffs physically in the basements, but also of placing them at the bottom of of the salary scales. Merit as a basis for employment and promotion frequently yields to preferential treatment of one type or another, and opportunity for professional development in public health often is limited indeed. There has been a feeling on the part of too many that public health positions are in the nature of a "call" to the particular individual, and that no other consideration need be entertained. It seems likely that with the din of industry and the jingle of coin as distractions this "call" will con-

tinue to go unheard by many desirable candidates.

A start on a well planned program for making public health positions more attractive is long overdue. Such a program requires more than setting up qualifications for applicants—it also means getting down to what the job has to offer. A necessary and desirable step in bringing about optimum employment conditions in public health service is the institution and extension of an impartial method for the selection and advancement of personnel—a civil service or a merit system. Such a plan when instituted by statute may be referred to as "civil service"; when originated by administrative rule, it is often called a "merit system." This is a rather fine distinction between terms, but in either case, the objective is the same—to apply the best and most enlightened principles of personnel administration to public service.

State civil service systems and their counterpart, merit systems, have followed a long and arduous course since the first state civil service law was passed by New York in 1883. Massachusetts followed with such a law two years later, after which 20 years elapsed before the States or Illinois and Wisconsin, in 1905, adopted laws defining the conditions of public employment. To date, such laws establishing state-wide civil service have been enacted in 20 states; 6 of these have constitutional provisions on which the system rests in whole or in part.

State merit systems have originated under somewhat different circumstances from state civil service systems. With one or two exceptions, states where merit systems exist have been moved to their establishment by the requirements of federal laws and regulations attached to financial payments to the states for "grant-in-aid" programs under the Social Security Act. As a result of these provisions 31 states and territories have established merit systems. The effect of federal requirements may be deduced from the fact that in 1940 alone, the year immediately following their adoption, 12 states established merit systems affecting public health personnel.

In the interest of promoting and maintaining sound personnel policies, federal administrative agencies are authorized to examine civil service or merit systems of states and territories receiving "grant-in-aid" funds. Such systems when submitted by the states and territories are considered by federal agencies under two headings, and approval or disapproval is given either or both of these. The two parts thus examined are: (1) the basic law or rule, (2) the classification and compensation plan. The score to date for 51 states and territories with the U. S. Public Health Service is:

	Reviewed	*Approved*
Law or rule.....	50	45
Classification and compensation plans	46	20

It is obvious that the most marked failures to come up to par have appeared in classification and compensation plans. And this is precisely the vital point where work must be done if success is to be achieved in making public health positions more attractive. In addition, the civil service laws of four states were judged defective in one or more respects. Also, one state and one territory operating a merit system have not had their implementing rules approved.

The Public Health Service does not attempt to tell states how much they shall pay their appointees, but the desirability of generous compensation as an aid in employing the more competent personnel is stressed. However, in determining the necessary qualifications of candidates for the basic public health positions of medical officer, nurse, and

engineer, the Public Health Service does insist that the states require certain predetermined attainments as a condition of appointment. Beyond that, also in the matter of job specifications, is the stipulation that positions carrying titles such as biologist, chemist, zoölogist, be filled only by people who have pursued degree courses with such subjects as majors. The adoption of a retirement plan, while not obligatory, is strongly urged, since it contributes effectively to the initial employment and the retention of desirable personnel. A source of great disappointment is the fact that less than half of the states have thus far devised such a plan.

It is in the holding of qualifying examinations that performance by the states and territories has been least satisfactory. To date, with the exception of a small number having well established civil service agencies, few have held examinations recently for professional personnel employed in public health positions. Usually examinations held have been designed for clerical, stenographic, and fiscal employees. Following them come the nurses. This sequence can be accounted for not only by the fact that nurses are most numerous among the other classified members of health department staffs, but also it is largely due to the coöperation and sympathy with the merit system plan shown both by individual nurses and the National Organization for Public Health Nursing. There is no apparent reason why persons of other professional categories have been examined so rarely. Certainly all should realize that the ultimate success of personnel administration on a merit basis for public health personnel will depend in great measure on the active support of those professional groups that are represented in the staffs of health departments. The current scarcity of suitable candidates for vacant positions need not act as a deterrent against examining and certifying acceptable present incumbents, who meet technical and other qualifications.

Shortly after the adoption of the federal requirement that systems of personnel administration be set up on a merit basis, the need arose for suitable test items and up-to-date examination procedure which would aid in the selection of persons capable of performing the duties of the positions. In order to avoid setting up special machinery at the federal level for assisting the states in preparing this material, the help of the American Public Health Association was requested jointly by the U. S. Public Health Service and the Childrens Bureau of the U. S. Department of Labor. That Association very graciously undertook this exceedingly difficult task. A small, highly competent staff has been employed to carry on the program, but they have worked in close coöperation with health officers, nurses, engineers, and others representing the several specialties in public health who have contributed their time and assistance on a voluntary basis. Up to the present, this unit has prepared 125 separate sets of examinations for positions in public health nursing, laboratory work, sanitation, and health administration. Twenty states and two cities have made use of this examination material. Additional test items for still more extensive use are now available for all grades of the foregoing fields of work.

An obstacle which has stood in the way of even more extensive use of this material has been the cost of making it available. This is a mistake and most unfortunate. Anyone who takes the time to investigate the matter can readily assure himself that the fees charged for this service compensate for only a very small fraction of the effort that is involved.

The best way to compare qualifications of applicants for positions is through the use of standardized test items. There is little hope for reciprocity between states and communities in the acceptance of credentials presented by candidates for public health positions unless it be on the basis of certification for positions with similar job specifications and common examination techniques. Such reciprocity is necessary to that freedom of movement among health jurisdictions which professional public health workers desire above all else. At present, the worker, and particularly the health officer, usually is required to be a resident of the state, and not infrequently he must also be a resident of the local community where he wishes to be employed. Actually, once employed, he is practically frozen on the job, or at least fixed within the system of which the local position is a unit. Excessive mobility, of course, is not desirable, but at least the feeling that one might move to another position if he so desired is mighty comforting. This movement should be planned so as to broaden the horizon of the individual and enrich his experience, and not altogether to gain a larger salary. Mobility should be permitted both up and down within a state health structure, and laterally among states. The federal agencies also could well be brought into the exchange so that federal, state, and local employees might acquire familiarity with the requirements of related positions. In fact, upon such an exchange may hinge the final success of our present federal-state-local partnership in public health.

In addition to stabilizing employment for public health workers and adjusting compensation, their jobs must be made otherwise rewarding. A person should feel that he is performing useful work and that he is utilizing to good advantage the knowledge and skills he possesses. The traditional routine of a small local health department is often quite stultifying, to say the least. In any situation, a sense of frustration naturally comes with the discovery that unsatisfactory conditions cannot be followed by the application of corrective measures. "Go and see your doctor," may be discreet advice to give parents on finding that their children need corrective work, but it does not impress the aggressive health officer or a discerning public as doing very much. Educational effort, such as this, has its place but it is not a satisfactory substitute for more tangible forms of remedial service. In many instances only by increasing the size of the health district and by encompassing within the public health program a wider range of activities will it be possible to provide necessary latitude for professional and technical development of the staff and permit placement of individuals according to their interests and capabilities.

Opportunities for employment should be extended to professional persons outside the traditional categories of physicians, nurses, and engineers. There is a broad group with good basic training in biology who have much to contribute, but are now largely ignored. Entomologists, in particular, can give fresh impetus to a fagging malaria control program. The newer insecticides and rodenticides open up still greater possibilities for control of disease-bearing vermin, and in this program chief reliance must be placed on entomologists. Unquestionably veterinarians have been snubbed by public health people. There are many diseases in animals transmissible to man which veterinarians are most competent to handle. They are especially familiar with animal food products, and should have many suggestions for improving food sanitation.

Another type of professional person whose activities are becoming of more and more importance to the public

health program is the health educator. The health educator is the vanguard of the advancing public health program. He is both psychologist and salesman. He goes directly to the people and shows them how and why they need public health measures. It is amazing, the tremendous strides taken by some of these people toward awakening the latent demand for public health services. Recently a local health officer from North Carolina reported that he had put on first one, then two, and finally three health educators, and that all were doing well. When asked if he was going to employ any more, he replied, "No, not until I can increase my general staff; the health educators have stimulated folks to the point where they are running our legs off!"

Up to the present time social workers have been used relatively little in the field of public health. The restricted scope of health program may account for this. However, with the inclusion of more extensive medical care in public health service, social workers, and especially medical social workers, should be of increasing value; and as mental hygiene expands, the psychiatric social worker will become indispensable.

A large part of the total public health job falls in the broad category of business administration: preparing estimates, hiring people, purchasing commodities, paying bills, keeping records, making reports, operating institutions, and the like. The general run of physicians and nurses, and to a lesser extent engineers, are not suited by interest or training for this field. Much of the inefficiency one encounters in public health can be attributed to the fact that good business methods have not been incorporated into administrative practice. Public health could well use competent business administrators.

Provision should also be made for extensive employment of persons auxiliary to the more strictly professional groups. To do this, public health must be broken down into component parts. On analysis one finds that seemingly complex operations contain many elements that can be segregated from the whole and set up as individual jobs to be performed by persons of less scientific training than formerly was thought necessary. By doing this, and using auxiliary workers, it will be possible, first of all, to effect economies, and second, to save the more highly trained people for their particular types of work. Moreover, this plan will afford employment to many persons who otherwise would be excluded from an important branch of public service.

There is, of course, the fear that auxiliary workers may not exhibit that fidelity to duty which is commonly associated with persons of professional outlook. Most health administrators have had painful experience with low-grade sanitary inspectors. The lay health visitor continues to be anathema to professional health workers in this country despite the fact that she has been the main reliance for home service abroad. Recent successful experience with lay venereal disease investigators indicates that our previous adamant position may not be altogether tenable. Now registered nurses have visions of aides just over the horizon whose only qualification is that they are motherly souls anxious to do good. Here again professional groups show an inveterate propensity to oppose developments which they believe contrary to their particular interest. When properly selected, trained, and supervised, people of limited technical background can do highly satisfactory work in certain fields of essential service. Also, experience has amply demonstrated that a guild spirit can be infused into those who follow the simpler crafts as well as those engaged in more intellectual pursuits.

Finally, all the jobs that are now available should be described and entered in suitable registers. The same should be done for the jobs that are likely to be established in the near future—that is, within perhaps the next few years. Already there are coming back from military services some well qualified persons looking for employment in public health and many others who might be induced to follow public health work as a career. They will wish to know exactly where these jobs are, what qualifications are prescribed, and the salary each position carries. With these facts at hand, anyone looking for employment, or anyone who wishes to be trained for a job, then can plot his course accordingly. For example, if a candidate wants to be a health officer in Alabama, or California, or New Hampshire, there should be readily available the information that will answer the very points that have just been enumerated.

Public health is entitled to a place of importance and prestige among federal, state, and local social services. To maintain a level of performance in keeping with this ideal, it has need of individuals possessing the inherent attributes that are required for success in any responsible position. Public health is looking for essentially the same kinds of persons to act as supervisors, clinicians, research workers, and general staff workers as are employers generally. Administrators have no reason to expect that a fair proportionate share will enter the public health field unless there is a forthright examination and reëxamination of the whole range of personnel policies and practices. Relying on the "call for service," and maintaining a lofty indifference to such mundane matters as compensation, promotion, professional advancement, security, and eventual retirement can only lead up a blind alley of narrowing usefulness.

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A Comprehensive Training Program for Public Health Personnel

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FROM the immediate pre-war years to the present, the State and Territorial Health Officers have made an important contribution to the expanding training program for public health personnel. The major development of the pre-war period was the provision of training opportunities under the terms of the Social Security Act, which anticipated the shortage of trained personnel that would confront health departments seeking to organize or expand. The onset of war created new shortages of public health personnel, leading to the development of emergency training for replacements, and for the new personnel required in war emergency areas. War is providing an additional stimulus to the training program, as demobilization creates the need for the education and training of veterans entering employment in public health, or returning to pre-war jobs in this field. In recognition of the importance of this program, the Committee on Personnel of the State and Territorial Health Officers at the 1944 Conference pointed out the desirability of the appointment in the state health departments of a personnel officer "to follow through on this new re-training and reëmployment program now while it is in a developmental stage."[1]

The next step is to prepare for the post-war period by the formulation and implementation of a *comprehensive* training program for the varied personnel required in an integrated national system of health and medical services. Some of you may recall the name of Lewis Meriam as an expert in the field of personnel training for the public service. Meriam's advice was: "Do not train for a specific class of positions without getting statistics, keeping statistics, watching statistics."[2] As a basis for the post-war training program, we must heed this advice: Get statistics on the number and types of public health personnel to be trained; and watch the statistics on the capacity of our schools of public health and other educational institutions to train them.

The content of the training program must be appraised and adapted to present and post-war needs. Is it providing sufficient training in administrative methods for the health officer of the future who may be called upon to direct a rural health center which includes a small hospital, and provides not only preventive services, but a complete program of home, office, and hospital care of the sick? Is it providing sufficient training for the average health officer of the present, who requires formal training in public administration as well as public health, and field experience prior to the assumption of his full duties?

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Another major responsibility of a comprehensive training program is the coördination of the federal, state, and local official health agencies, the national professional health associations, and other national nonofficial agencies in a plan of technical coöperation. Finally, a broad training program must be implemented by adequate financial aid.

At the suggestion of the Surgeon General, the Public Health Service in June, 1944, took the first step toward the development of such a comprehensive program by the organization of a Committee on the Post-war Training of Public Health Personnel, of which I have had the privilege of serving as Chairman. It is on the recommendation of that committee that this session of the present Conference has been arranged, for the purpose of describing the nature of the comprehensive training program we envisage, and the more urgent problems requiring attention.

SCOPE OF A COMPREHENSIVE TRAINING PROGRAM

With respect to scope, a comprehensive personnel training program resembles the program of a local agency in three of the elements with which it is concerned, i.e., recruitment of personnel, induction training, and in-service training. However, the scope of the comprehensive national training program widens to embrace a fourth major field, which may be described as *preëntry*, or *preëmployment*, or *preservice training*. We may review the relation of four aspects of the overall personnel training program.

I. PREËMPLOYMENT TRAINING

Under preëmployment training is included the basic professional or technical training required to prepare prospective entrants to employment in the public health field. Such training may be limited to academic study or to field practice, or may include a combined period of academic and field training. In a comprehensive personnel training program there would be a triple responsibility to insure, (1) training adequate in scope and content, (2) educational institutions and field centers adequate in capacity to meet the national need, and (3) the recruitment of trainees whose personal and educational qualifications adapt them to successful practice in the field in which they specialize.

The schools of public health occupy the central position among the educational institutions in this field, being concerned with preëntry training as well as with training following induction.

Dr. Lowell Reed, Dean of the School of Public Health at Johns Hopkins University, has recently summed up an extensive experience both at his own institution and at other schools of public health.[3]

The rôle of the school of public health has turned out to be somewhat different from that anticipated originally. Starting with the intention of training medical personnel to become health officers, the schools have found fewer health officer applicants than expected and more persons with other objectives seeking training in public health administration. These include administrators of special services—tuberculosis, venereal disease, maternal and child health, as well as such other professional workers as dentists, nurses, and sanitary engineers.

Contrary to what was originally anticipated also, the schools cannot serve as procurement agencies. Procurement must be related to employment opportunity; the schools cannot give jobs or guarantee jobs. The states must recruit trainees, and the local opportunity for employment is the strongest inducement to seek training.

Nor is it feasible, as was first thought, for the schools to set up field training

centers other than for field laboratory exercises, observation and special studies.

Effective field training must provide the trainee the opportunity for assuming responsibility for work done. Only the official health department, state or local, can offer field training with responsibility attached. A single health jurisdiction, however, cannot absorb a group and assign responsibility. This overloads the department beyond its capacity.

Which health departments are suitable as training centers? The schools cannot settle this problem. Approval or accreditation is a function better suited to a professional agency such as the American Public Health Association.

Today the schools of public health provide a basic core of instruction in public health problems and administration but also provide opportunities for clinical training in special fields such as pediatrics, tuberculosis, and syphilis.

While the schools of public health represent the major educational institutions in this field, it should be noted that a large number of colleges and universities, both in their undergraduate and graduate departments, contribute to preëmployment training, providing basic and advanced curricula for public health nurses, sanitary engineers, laboratory workers, and other professional and technical public health personnel.

An intelligent evaluation of needed academic curricula presupposes the existence of complete statements of the training requirements of the varied positions in the public health field. We owe to the American Public Health Association and, in particular, to its Committee on Professional Education, under the able leadership of Dr. William Shepard, the development of a series of statements on the educational qualifications of public health personnel which meets this need.

A comprehensive training program would include funds to support job analyses. It is quite possible that new or modified curricula are needed today to meet the needs of the field. It is notable, for example, that the necessity for requiring the completion of an approved program of study in public health nursing by every nurse participating in the public health program is being questioned by leaders in the field of public health nursing, who, furthermore, contemplate the extensive utilization of practical nurses as assistants to fully trained public health nurses.[4] It seems possible that sub-professional personnel could be employed in additional public health activities. However, the adaptation of preëmployment training to meet such new personnel needs will require a well planned program of personnel research.

At present trainees are selected without very good criteria of their probable success after training. Several methods of recruitment are possible:

1. A short orientation period before admission to formal training. This procedure has been used with considerable success by the New York Department of Health.

2. National recruitment by the Public Health Service. Such a method of recruitment is being practised now for the training of health educators. In general, the trainees have been superior individuals. Some states that are anxious to recruit qualified health education trainees have asked the Public Health Service to send them the application blanks of individuals living in their state who might accept training stipends from the state.

3. Development of aptitude tests as a basis for recruitment.

In many fields it is possible to test the aptitude of an individual and measure objectively his chances of success in a given profession. No research to determine what can be done with this same approach in the public health profession has been attempted, but it is a problem worthy of consideration.

II. RECRUITMENT OF PERSONNEL

Improvement of the terms of employ-

ment in public health through promotion of the merit system represents one of the essential steps to be taken in a long-term program to attract an adequate number of personnel to this field. The importance of this measure is fully recognized by the members of this Conference. An important approach to recruitment can be made through the medical schools and schools of nursing by appropriate emphasis on the opportunities for specialization in public health administration or service in a special field of disease control. One of the newer possibilities is recruitment among veterans. As a contribution to this aspect of recruitment, the Committee on Professional Education of the American Public Health Association has compiled a summary of the training requirements for professional and technical public health personnel for the use of employment counsellors.[5] The second step in the veterans' program, a survey of present and post-war openings in state and local health departments, is now being completed by the Public Health Service. Financial assistance in the form of scholarships and fellowships to selected students who could not personally finance basic public health training should be provided as an aid to recruitment.

III. INDUCTION TRAINING

I use the designation "induction training" to include the training financed under Titles V and VI of the Social Security Act and the Venereal Disease Control Act, as well as the short courses devised to provide emergency training during the war. This training, provided to meet requirements which should have been satisfied before induction, should be distinguished from the in-service training of new employees which is an important element in every well planned personnel training program.

The pattern of this aspect of the training program is generally familiar to the members of this Conference, and the proceedings of your previous meetings indicate your awareness of its defects. The preparation of personnel for the expansion of health departments promoted with Social Security Funds justified the pre-war emphasis on induction training and its continued emphasis under the modified terms enforced by the war itself. However, it should be an aim of the post-war period to restore gradually the balance that has been lost during the continuing shortage of trained personnel. Emphasis should be placed on complete academic and field training prior to employment rather than on training after induction either through short academic orientation or make-shift training on the job. This realignment will take place as soon as the pressure for personnel is relieved.

IV. IN-SERVICE TRAINING

The purposes served by the in-service training program have been aptly summarized as follows:

1. To make up for deficiencies in technical and scientific information required for the job generally
2. To enlarge the outlook and understanding on the specific job
3. To acquaint the staff with the fundamentals of personal and public relationships in order to encourage smoother functioning of the day-to-day job
4. To keep the staff abreast of newer, technical, procedural and administrative developments as derived from experience in other jurisdictions [6]

A variety of methods has been used to promote these objectives, including the following:

1. Orientation course
2. Field orientation in a well organized health department or demonstration center
3. Conferences
4. Institutes
5. Staff meetings
6. Refresher courses
7. The more intensive type of practical experience comparable to the internship which

industry has developed for the training of executives

Field experience provided either as a device for selection of trainees or as a method of training has been discussed recently by New York State's Health Commissioner, Dr. Godfrey.[7]

Orientation of a trainee, in the belief of Dr. Godfrey, is helpful both to the trainee and the employer. The trainee needs an opportunity to assure himself that he is going to like a public health career. The employer, on his part, wants some inkling as to whether the trainee shows signs of being cut out for this sort of work.

Dr. Godfrey visualizes three types of induction courses:

1. Internship in a going concern (not a demonstration area)
2. Operational internship in a health department subsidized for special training purposes
3. Observational training in a well developed health department—a demonstration area

In any of these plans there are limitations. An operating department can absorb only a limited number of trainees without disrupting its own work. Neither can a subsidized health department with a special educational director, place any number of people in responsible positions, and the carrying of responsibility is needed in real training.

The time of internship or observation is an important factor. For orientation purposes at least three months is necessary for actual training; however, nine months is felt to be the minimum.

Dr. Godfrey feels that for orientation purposes, there should be no examination of the usual type in selecting applicants. He believes that not one officer, but a board of several should select applicants on the basis of their combined judgment.

The content of in-service training necessarily varies according to the needs of the employee group, which may be newly inducted or composed of old employees, of administrative or service personnel, professional, technical or sub-professional workers. The field of instruction may be the general public health activities of the agency, those of a single class of personnel, such as public health nurses, or the activities in a specialized field such as the control of venereal disease, tuberculosis, or malaria and other tropical diseases.

Assistance in arranging for the approval of field training centers, the provision of necessary supervisory and educational staff, and the general planning of in-service training for state and local units could well be rendered by a central administrative agency in a national, coördinated program.

THE NATURE OF THE TRAINING PROGRAM

A survey made by the U. S. Public Health Service in July, 1945, indicated a total of about 20,000 full-time professional and technical workers in state and full-time local health departments. In addition, a total of 5,810 vacancies was reported of which 2,579 were being held for persons in the armed forces and 3,231 were "open" vacancies, making a total of about 25,000 established positions (Table 1). If this figure is corrected for an apparent under-enumeration of public health nurses and dental hygienists, it becomes about 29,000.

Long-range planning requires an estimate of the number of various types of personnel that will be needed to bring the nation's health services up to a level of adequacy. Emerson [8] has estimated that at a minimum, an additional 25,000 full-time personnel of all types will be required, including some 12,600 public health nurses, 1,350 professionally trained sanitation personnel, 1,100 skilled laboratory workers, 140 full-time dentists and 2,400 part-time den-

TABLE 1

Estimated Number of Full-time Personnel in State and Full-time Local Health Departments and Existing Vacancies *

Type of Position	Total Established Positions	Total Vacancies Plus Positions Held for Persons in Armed Forces	Positions Held for Persons in Armed Forces	Vacancies	
				Number	Per cent
	(1)	(2)	(3)	(4)	(5)
Health officer	1,219	300	176	124	10
Other M.D.'s	1,801	570	269	301	17
Public health nurses †	12,007	2,701	1,054	1,647	14
Public health engineers	770	382	244	138	18
Dentists	381	133	85	48	13
Dental hygienists †	95	25	5	20	21
Statisticians	396	80	21	59	15
Laboratory workers	2,996	587	192	395	13
Health educators	255	73	11	62	24
Veterinarians	423	70	40	30	7
Other sanitation personnel	5,002	889	482	407	8
Total	25,345	5,810	2,579	3,231	13

* Based on survey made by U. S. Public Health Service, July, 1945. Total estimated from returns received which were 80 per cent of all full-time jurisdictions.

† The number of graduate nurses is low because the survey did not include full-time personnel in health departments under a part-time health officer. The number of dental hygienists is low because this type of personnel was not asked for specifically on the survey questionnaire. The number of these two types of personnel in local health departments can be estimated from: Emerson, Haven. *Local Health Units for the Nation*. The Commonwealth Fund, New York, 1945.

The total figures for state and local health departments become:

	(1)	(2)	(3)	(4)	(5)
Graduate nurses	15,114	3,309	1,346	1,963	13
Dental hygienists	332	79	17	62	19

tists, 3,950 dental hygienists, and 490 health educators. These figures indicate the personnel to be reached eventually in an expanding training program.

Overall planning requires additional estimates of the number of students who may pursue public health training prior to employment in the field, normal replacements in existing positions, as well as the number who may be admitted to training after induction. Estimates of the probable training load for each of the major types of personnel will be essential as a basis for planning the necessary extension of the facilities of existing educational institutions, the possible need for new academic facilities, as well as the field and demonstration centers essential in an integrated system of formal study and field training. The Surgeon General's Committee on Post-war Training of Public Health Personnel estimates that the annual load of public health trainees requiring a full academic year in a school of public health will be 600 to 1,000 for the next few years.

Both the preëmployment and in-service phases of the training program should be planned with reference to the immediate and long-term prospects for employment of special categories of personnel. The war has intensified the demand for physicians, nurses, engineers, and chemists trained in public health work, for service in the field of industrial hygiene. The acute shortage of industrial hygiene personnel may be expected to continue in the immediate post-war period. Health educators represent another type of personnel for which the war emergency has increased the demand. The personnel inducted into such rapidly growing fields are relatively young compared with employees in the established field of general public health administration. It should be noted that present trends in medical care point to an increasing need for physicians with training in public

health, including administration, to serve as directors of school health programs, medical prepayment plans, hospitals, nonofficial health organizations and welfare agencies concerned with public medical care. Thus, aside from the health officers and other medical personnel who will be required in the continued expansion of our local health departments, the movement toward increased organization of medical services is increasing the demand for physicians with basic training in public health. Finally, appraisal of the training requirements of public health personnel should be made to determine an economical allocation of the training load between the schools of public health and related departments of graduate schools, as well as the undergraduate departments of colleges, and the technical and vocational schools.

FEDERAL-STATE RELATIONS, AND OFFICIAL VERSUS NONOFFICIAL RESPONSIBILITIES

What rôle should be assumed by the Public Health Service in a comprehensive personnel training program? How should the state health departments be integrated in the training activities? What criteria shall determine an appropriate division of responsibility between the Service, for example, and the American Public Health Association? What are the areas in which the foundations and other nonofficial agencies can contribute most significantly? Such questions as these can be considered only briefly and tentatively here, but they suggest the nature of the numerous preliminary problems to be solved.

It may be assumed that the Public Health Service would provide technical and financial aid to the states in support of state and local training activities according to the general pattern developed under Title VI. However, the objectives of federal aid would not, as at present, be limited largely to the promotion of induction training, but would extend back to preëmployment training, and forward, to in-service training. A central office in the Service under the administration of an Educational Director would have as one of its functions the provision of a consultant service to the states in matters relating to the training program of small jurisdictions. As a second function, the central office might coöperate with the District offices of the Service in planning in-service training activities for state health department personnel. In addition to these coöperative services, the central office might serve as a screening center for the selection of trainees, and the direct recruitment of certain types of personnel, by conducting orientation courses and operating field orientation centers. Personnel research, the development of criteria for the approval of curricula and field training centers, and the coördination of statistics on personnel and training needs would be included among the general activities of the central office.

In addition to federal financial aid to trainees, in any extensive program it may be necessary to provide grants to schools of public health to enable them to expand facilities and personnel to take care of the increased load. The major financial responsibility for training public health personnel rests at present with the eight generally recognized schools of public health. The cost of training each student is at least $1,000 over and above tuition. Thus the schools cannot increase the volume of their training program materially without outside aid. The interstate character of the services rendered by all schools of public health is a strong argument for spreading the cost. Since the maintenance of public health is a

responsibility of government, subsidies for such training may be considered a proper governmental responsibility.

Aside from the conduct of their own personnel training programs, the state health departments would assume responsibility for personnel training in the small local health agencies. Selected state health departments might be called upon to maintain field training centers to be utilized on a regional basis. With respect to organization, the large state health departments would require a personnel unit headed by an educational director. The Conference of State and Territorial Health Officers has already recommended that the states appoint a personnel director to coördinate veteran training and employment.

The long experience of the American Public Health Association in the field of professional education, combined with its position as the professional organization of workers in public health, suggest it as the appropriate agency to appraise the schools of public health and the curricula of other educational institutions training public health personnel. Such an appraisal would be followed by its recommendation of the various educational units for approval. The evaluation and approval of field training centers would represent another activity appropriate to this association.

An example of a proposed project supported by voluntary funds which will make a valuable contribution to education and personnel training is the educational program for hospital administrators developed by the W. K. Kellogg Foundation. This project is of special interest in connection with the recent endorsement by the American Public Health Association of a national health program.

In conclusion, I should like to quote from the Association's official statement on this program, Recommendation VII b, as follows:

"State health departments should utilize those funds that may be available to train personnel in such technics as administration of health and medical services, and hospitals. Such a training program may contribute more than any other single activity to the future rôle of the official public health agency."[9]

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The Health Officer and His Personnel

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IT has been my good fortune to number among my friends many health officers, particularly in the West. I am privileged to visit them on their own grounds and discuss the problems of public health which interest them most. We speak the same language and often hold the same viewpoints. Many of these friends are becoming big businessmen as compared with 20 years ago. In those days appropriations came from but one source, legislature, county commissioners, or city council. They were usually cut to the point where our problems, all but one, were simple. That problem was how to get the most urgent work done with our small staff. Otherwise, we had no worries about complicated accounting, multiplicity of reports and bureaus, punch cards and mechanical sorting, and such "frills" as merit systems, health education, industrial toxicology, and surveys. We had few personnel worries because we had such limited personnel. We hired and fired without let or hindrance from the Merit System; we trained the staff ourselves in the old-fashioned belief that public health was important enough to call forth a man's utmost efforts regardless of his schooling or rate of pay. Any physician who was eccentric enough to forsake the lucrative private practice of medicine because he thought there were greater opportunities for service in public health, was a right minded fellow and did not need further formal schooling. We would show him the path of righteousness in Rosenau and the *American Journal of Public Health*, and by patience and persistence we would sometimes turn out a pretty good epidemiologist or assistant health officer.

But those days are gone, never to return. Public health is coming into its own. It receives much more of the public support which it deserves. Official health departments are becoming, in fact as well as in mind, a major function of government. None of us waste time longing for return of the old days. Public health is on the march and we are fully occupied with a rapid and fruitful advance. One of the problems we discuss most often these days is personnel, their selection and management.

Surgeon General Parran in his dedicatory address at the University of Michigan School of Public Health said, "The tripod upon which the public health structure of any country rests is: (1) A force of well trained personnel; (2) the appointment, promotion and retention of personnel on a merit basis; (3) adequate financial support, evidencing public understanding of the problems involved."[1] It is my contention that the third, adequate financial support, depends largely on the other

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two, well qualified and properly handled personnel. That is what I wish to discuss here.

Great advances are being made in personnel selection and management. These are new techniques as important to the public health administrator as new methods for the control of communicable diseases. We can no more run a modern health department with rule-of-thumb personnel policies than we can depend on the olfactory sense to diagnose diphtheria.

Few here would deny that public health is a specialty in which postgraduate training and practical experience are highly desirable. This applies not alone to the profession of medicine, but to nursing, engineering, dentistry, education, and all of the other professions from which career people in public health are recruited. While a physician or a nurse without special training has often done very well in public health in the past, nevertheless, and speaking generally, the individual with special training, already possessing the other attributes essential to success in this field, will do better and go farther than one similarly equipped but without special training. Certainly a young person seeking a professional career in public health today should be advised to obtain postgraduate education. That being the case, what kind of education is most desirable?

It has been our custom to recommend one of the well established schools of public health. Are they doing the job we need done?

In discussing these questions with health officers, there is rather general agreement that their personnel do benefit from courses taken at schools of public health and that they bring back much of value to the community, and the rest of the staff. They do, however, voice two main criticisms which are common enough to be expressed here and which seem to apply rather generally. We shall see presently that some of these criticisms arise from conditions which the schools alone cannot correct, and that the correction of some would be undesirable in long-term educational results. But by closer understanding of each other's problems we may all be able to work together on their solution.

The first objection expressed by health officers to the results produced by schools of public health merely indicates the age-old difference in viewpoint between "those who do and those who teach." It is that the student gets too much theory and not enough practical instruction. Specifically, there is too much bacteriology and laboratory exercise, too much detail in statistical method, too much philosophy and historical background.

The second objection expressed is that there is too little teaching of the things the health officer must do or know personally, such as: business administration (including correspondence, office management, personnel management, delegation of authority), political science and theory of government (including government and public health law), public speaking, health education, school health, and community organization. In addition, there is sometimes expressed a desire for more knowledge of the background and potential values of public health nursing, medical social work, and teaching.

These criticisms are supported by the fact that few health officers fail because they lack public health knowledge. There have been many examples of successful health officers whose public health knowledge was sketchy at best, but who were past masters at statesmanship. Failure, or at least lack of conspicuous success, is more often attributable to such things as lack of administrative knowledge, inability to understand people, failure to exert

community leadership, lack of knowledge of community organization. Perhaps these are qualities that cannot be taught, but I doubt it.

In defense of the schools it must be pointed out that they are primarily institutions of higher learning. They are not vocational or trade schools. There are so many good ways of accomplishing the same results in public health administration that the last thing the schools wish to do is to freeze the student's thinking. Their purpose is to encourage original thinking based on a sound knowledge of underlying philosophies. Only by such original thought can progress be made. The last thing the health officer would want is a recent graduate who was indoctrinated with the "one and only way" of doing things as taught at a given institution. He is likely to have his own pet "one and only" way, and will often expect the new appointee to accept it without question. The purpose of the schools, then, is to try to strike a happy medium between theory and application.

It is a fact, however, that teaching public health as a specialty is relatively new as compared with medicine, law, or engineering. It has grown in part by feeling its way. It is quite different from teaching medicine in which many indisputable facts must be mastered, then the application of these facts taught by the clinic method. There is general agreement that the practising physician's job is to heal the sick. In his case, job analysis is simple.

It is also a fact that some schools of public health have perhaps necessarily had to build their curricula by means of the professor's introspection; that is, how he did things and why. This method may suffice for a time but it is likely to lead to incompleteness, antiquation, and sometimes even distortion. Nevertheless, in general, the schools of public health have done well in developing and upholding the science, disipline, and culture inherent in public health.

One method of keeping the teacher currently abreast of the changing demands upon his students is through occasional job analyses. In vocational schools the job analysis is the guide to the curriculum. This is because there is but one, or at most there are a few, best ways to lay brick, cut stone, operate a turret lathe. Not so with public health where there are an infinite number of good ways to preserve and improve community health. Furthermore, we are seldom assured that any of our present methods are the last word. Public health work is a profession, not a vocation. Its advance therefore depends upon minds with a rich cultural and scientific background combined with practical ability to devise and apply measures aimed toward realization of our ideals.

Nevertheless, job analysis may offer a useful adjunct and guide to curriculum construction in schools of public health. E. K. Strong has used this method of constructing curricula for plant executives and some engineers.[2] There is a well recognized technique for job analysis, which might be interesting and helpful to apply to the job of the health officer.[3] Briefly it consists of listing all the different things that the health officer actually does. When the list is complete it is broken down into related and similar functions, then the educator and the health officer try to agree on what types of training are needed to carry out these functions best. Does anyone know exactly what the health officer does, and what proportion of his time is spent on each duty? In my observation they spend a great deal of time on functions they never learned at school. Perhaps they are functions that cannot, or should not, be taught for fear of indoctrination. But it would be interesting to find out. Possibly the Public Health

Service could spare personnel to make a few analyses to see what they are worth.

There is an association of schools of public health which, I am sure, would be most receptive to any constructive suggestions that this group of health officers might wish to make. Deans of the individual schools are glad to hear from health officers who have helpful proposals designed to improve the school's methods.

One thing is certain and it concerns all who are interested in the training of our future health officers and other public health people. There is great danger of numerous and inferior schools of public health springing up in this country under the attractiveness of federal stipends through the U. S. Public Health Service and the Veterans Bureau. This possibility is increased by the attitude of some state fiscal agents who dislike to spend money outside their own state, even when it was federal money to start with. State health officers must do all in their power to break down this prejudice by pointing out that:

> It is far better to have a few good schools than to have inferior ones in every state.
>
> The volume of public health personnel applying for training in normal times will probably never justify as many schools of public health as there are medical schools; probably ten or twelve good ones would suffice.
>
> The best of training is none too good for those who will be entrusted with preserving the health of the citizens of the state.
>
> Such training is a complicated and expensive process requiring teaching personnel and facilities far beyond the resources of most states.

If this is not done, we are threatened with the situation of the Class B and C medical schools of a generation ago, and even with the diploma mills of two generations ago. This is a serious menace and it merits the most careful consideration of this body. It is already being studied by the Association of Schools of Public Health and by the Committee on Professional Education of the American Public Health Association.

So much for the training of public health personnel to which this session is devoted, and for an important part of the first leg of Dr. Parran's tripod. When time permits, this group might profitably spend some time considering the best and most modern methods of selecting qualified personnel. The Committee on Professional Education feels that it has in its Merit System Unit a modern and helpful device for this purpose. More than 110 examinations of the most modern kind have already been given in 20 states, and demands for our services are increasing. These examinations are furnished states and cities at cost. They are proving far more trustworthy than anything we have had heretofore, since they test judgment as well as knowledge, and place less reliance on the glibness of the good talker and good writer. The method has been described in some detail by Atwater and Long.[4] Its importance to the health officer is pointed out by Burney and Hemphill.[5]

Once well trained personnel has been selected they are entitled to fair and modern treatment by their employer. Newer methods of personnel management may not be fully understood by those of us who were accustomed to hire and fire at will. They are important, however, as the second leg of the tripod and will merit careful study when time and occasion permit.

With your help, the post-war period can bring into public health careers the ablest and most promising recruits we have ever seen. Facilities for their training will be developed as needed. Such training will be along the lines that you suggest so long as your suggestions remain within the bounds of good science and good education. As more able young people are attracted

to our field, better results will be obtained and greater support will be forthcoming, and thus a benign cycle is completed by attracting still more able people to the field. Much depends on the way they are trained, selected, and supervised by their present employers.

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Recognizing the Services of the Volunteer Nurse's Aide

Stella Goostray, Chairman of the National Nursing Council for war Service, New York City, has asked the Volunteer Nurse's Aide Committee of the American Red Cross to convey to every Nurse's Aide the thanks of the nursing profession for the war service so faithfully rendered. More than 207,000 women have been associated with this program through 1,313 Chapters of the Red Cross. Miss Goostray expressed the hope that, where nurse shortages still persist during the transition period, Nurse's Aides will continue their services.

According to Miss Goostray, the most important continuing service which the nursing profession asks of the Aide army is one in which all can play a part, particularly those women who are free from the need to hold paid positions. Those who now know nursing and hospitals and public health services from the inside can be a vast power for creating the public opinion that can demand and obtain better health services.

Women who have served as Red Cross Nurse's Aides should prove invaluable members of community nursing councils, health councils, hospital boards, and public health nursing boards. As members of such groups, they can work with doctors, nurses, hospital administrators, and others to further the ultimate aim of nursing—which is a fuller and richer life for everyone through better health.

Statistical Research in Clinical Tests for Nutritional Deficiencies*

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THE idea that malnutrition is a condition which is identifiable by means of some overall index or a few signs is no longer tenable. The manifestations of malnutrition are as numerous as the substances needed to support growth, maintain the life processes, and sustain the normal functioning of the organism. It has been shown that all tissues throughout life are in a dynamic state, that is, they are constantly being renewed, and a continuous supply of the substances used in any part of the whole life process must be available. A breakdown in the availability of any needed substance results in a disturbance or abnormality in the tissue which requires that substance directly or indirectly for its functioning or structure, that is, a nutritional disease is produced. Each nutritional disease is an entity with characteristic pathognomonic signs. Malnutrition, therefore, is indicated by the presence of one or a number of the various nutritional disturbances and diseases which may result from failure in the supply to meet fully the bodily requirements. As an inclusive term for a group of pathological conditions which arise from a deficiency of one or more of a very large number of nutrients, malnutrition has meaning, but the expression "prevalence of malnutrition" leads to confusion and disagreement due to lack of clarity as to what is included.

The nature and extent of malnutrition in the population is a problem that must be studied in terms of the prevalence of specific deficiency diseases. For this, diagnostic methods for each deficiency are essential. The need of the animal body for more than thirty substances has been established on the demonstration that a lack of any one of them produces some definite ill effects. For most of the so-called major deficiencies in humans, only the signs or pathological manifestations associated with a severe or almost total deficiency have been well enough defined to be used as diagnostic criteria. Most students of nutrition are agreed that less severe deficiencies of needed nutrients produce lesions which are detrimental to health; and it is these lesions which arise from moderate or mild deficiencies which are believed to be extremely prevalent in the population. Thus we are concerned not merely with the diagnosis of each of many deficiency diseases but with tests or criteria to identify changes that are specific for various stages or gradations in the pathological process produced by a deficiency. Obviously, intensive study of lesions at various stages of deficiency is required for each nutrient. Progress is being made in identifying signs of deficiency states, but knowledge of manifestations at different stages is very unequally developed for different deficiencies.

* Based on a paper presented at a Joint Session of the Vital Statistics and Food and Nutrition Sections of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

Research on diagnostic methods is being conducted by many groups and is of different types. The tests may be classified broadly into four types, namely, biochemical tests of blood concentration, excretion tests, functional or biophysical tests, and clinical and morphological examinations including examination with x-ray and microscope. These tests disclose, respectively: (1) recent intake or availability through assimilation of given nutrients; (2) saturation of tissues; (3) ability of the affected bodily system to react or function normally; and (4) modification of tissues or anatomical changes, including hematological changes associated with anemia. Each type of test furnishes a different kind of information about the nutritive state. Blood and excretion levels fluctuate, rapidly for some substances and less rapidly for others which may be stored. Unsatisfactory levels give no information as to how long this state has prevailed, and satisfactory levels may be of recent origin. Functional tests, such as visual adaptation in the dark and resistance of capillary walls to pressure, have so far proved unsatisfactory as independent, specific, and reliable indices of a lowered nutritive state. Clinical and morphological methods reveal the cumulative effect of an inadequate supply of a nutrient on modifying bodily tissues which require the nutrient. It is apparent that findings from these four types of methods do not give interchangeable indices of a deficiency condition; nor do they necessarily bear a constant relationship one to the other. Furthermore, comparison of the relative prevalence of different nutritive deficiencies is unwarranted if different types of diagnostic methods have been used for the various deficiencies.

The mild and moderate forms of most nutritional diseases probably can best be identified and diagnosed by the lesions resulting from the cumulative effects of a moderate and possibly intermittent deficiency. From studying the sequence of tissue changes in four avitaminoses (A, ascorbic acid, riboflavin, and niacin) Kruse,[1] in his article on "A Concept of the Deficiency States," has described certain general principles in the evolution of deficiency diseases, with special reference to the characteristics of early and mild deficiency states. This concept cannot be given in detail here, but the basic characteristics of the pathological changes involved in these deficiency states may be mentioned. First, it is stated that a specific deficiency invariably affects particular tissue sites and characteristic lesions appear. The pathological process develops at various rates, depending on the "causal force," that is, the degree of the deficiency and the rate of change from the previous levels. An abrupt or rapid change in intake produces a pathological process which is rapid in onset and in development. This is the acute form of the deficiency diseases and it may be severe or mild depending on the degree or intensity of the deficiency. A gradual, slow change from an optimum supply of the vitamin to an inadequate supply causes a process that is slow in onset and progresses slowly, becoming somewhat more accelerated as the intensity of the deficiency becomes more marked. This is the chronic process and it also varies from mild to severe according to intensity, and may be early or advanced according to the duration of the deficiency. The acute and chronic forms have characteristic lesions and each form progresses through various stages, from early to advanced. The rate of reversal of the lesion is governed by its rate of development, and the time required is related to the stage or degree of change. The severe acute form corresponds to the frank, clinical deficiency state and is diagnosed by gross examination. The mild acute and chronic

forms can best be diagnosed with the aid of the biomicroscope, although at advanced stages these forms also are macroscopic.

The deficiency states found in individuals in the general population are not distinct and separate as to form; that is, the acute and chronic forms occur in combinations of various stages of both forms. At a given time, only signs of a chronic process may be present, but frequently an acute process is superimposed on a mild or moderately severe chronic form. Both intake and requirements of an individual are subject to constant or frequent change with the result that the deficiency process also undergoes change and may shift from one form to another. Arrest or even reversal of lesions may occur on an optimum diet, but it now appears that seldom are chronic lesions completely cured unless appropriate therapy is instituted. This may be because it is rare for anyone consistently to have an optimum intake over a period sufficiently long to cure the slowly receding chronic lesion, or it may be that response is obtained only on therapeutic levels. The occurrence of these different forms, singly or in combination, at various stages makes necessary a system of classification of nutritional diseases in order adequately to describe and to compare the deficiency states found in different groups of the population.

The tissue sites selected by Dr. Kruse for detection of the four avitaminoses studied are: for vitamin A, the conjunctiva; for riboflavin, the cornea; for ascorbic acid, the gums; and for niacin, the tongue. He believes that lesions in these tissue sites are specific and early, if not the earliest, and that regardless of what other signs and symptoms may also have specific diagnostic value for these deficiencies, evidence of the deficiency will be found in these sites. These qualities of specificity, unfailing occurrence, varying nature of the lesions in accordance with severity and form of the deficiency state, and accessibility of the sites for examination make these diagnostic criteria especially useful for public health surveys and for studies of relationship of deficiency states to other diseases and symptomatic complaints, efficiency, fatigue, etc.

General acceptance of the diagnostic criteria outlined by Dr. Kruse for these four avitaminoses awaits further study and confirmation by independent research. In several studies, failure of a specific lesion to respond to therapy has been reported, and the specificity of some of the lesions for a particular deficiency has, therefore, been questioned, or, it has been suggested that some lesions may not be reversible. A detailed discussion of the evidence available for and against the validity of these clinical signs as diagnostic criteria cannot be given. Studies on human nutrition are necessarily complex and difficult to conduct under controlled conditions. Both internal and external environment introduce conditioning factors which cause variable results; and the well known difficulty of obtaining uniformity among examiners in appraising the condition of any tissue is always a potential source of disagreement. Perhaps of fundamental importance as affecting differences in therapeutic results now being reported is the differentiation of the acute and chronic forms of deficiency states, as proposed by Dr. Kruse, and the associated concept that the rate of reversal of lesions is a function of the rate of their development.

In research on pathological changes in tissues associated with specific deficiencies, statistical analysis has little to contribute. The statistician may be of assistance in some phases of a study, as for example, in selecting experimental and control subjects so that the groups are equalized in respect to relevant variables; or in directing atten-

tion to certain principles, such as the importance of a control group, and of maintaining identical conditions for it and the experimental group, and the need for independent, unbiased observations on control and experimental subjects. But major importance in this type of research attaches to careful observations and well defined criteria for classification of subjects with respect to their initial status and to changes in tissue, so that other workers can duplicate the observations, and subjects in different studies can be compared as to initial status and post-experimental status.

Progress in the problem of identifying lesions which are associated with a slight or moderate deficiency of a particular nutrient can be aided greatly by animal experiments. Intake levels, previous to and during the experimental period, can be controlled both for the nutrient being investigated and other dietary factors, and genetic and environmental factors can be equalized for control and experimental animals. Chronic changes can be studied in months in the rat that would take years in man. All tissues can be examined and changes described for various degrees and durations of deficiency. However, final proof of the manifestations of human deficiency states must come from studies on man.

In laboratory methods for appraising nutritional status, statistical methods may play a significant rôle, and one which has too often been neglected. Here, there is need to evaluate the accuracy of techniques. In laboratory procedures, opportunities for error are frequent. Errors arise in weighing and measuring chemicals and solutions, in reading a pipette or burette, in the manipulation of instruments, as for example, the handling and reading of a colorimeter, and from variation in chemicals used, and in their interaction in combination. Special data may have to be collected to obtain observations made under conditions controlled for obtaining the independent observations needed for measurement of the different accidental and procedural errors. With a number of steps or variables in the laboratory procedure, some of which may operate independently and result in purely accidental errors, and some of which may introduce a systematic error, rather intricate statistical procedures may be required to identify the sources and magnitude of errors and to determine the net error of the final value. An understanding of the sources and types of errors will be useful in standardizing the use of a procedure so that the total net error will be a minimum. Knowledge of the magnitude of the net error is essential for accurate interpretation of the results.

Examples of analysis of a laboratory procedure in general use for appraising nutritional status can be found in two papers [2, 3] in the series on Medical Evaluation of Nutritional Status from the coöperative study of high school students in New York City. These papers discuss errors in the photelometric method of determining ascorbic acid in plasma on a macro sample and on a micro sample. The details of the analysis cannot be given in this brief discussion, but it is of interest that a preliminary analysis of the method before its general use in the survey resulted in some modification of the published procedure and in a standardized procedure for the survey which increased the reliability of individual plasma ascorbic acid determinations.

The importance of knowing the error to be expected in chemical and other determinations is sometimes overlooked. In the appraisal of nutritional status, individual values are classified in terms of the deviation from some "normal" or standard value or range of values. The degree of deviation from any postulated normal value which may be con-

sidered significant will depend on the error of an individual value. Furthermore, if the same biological value is determined by two methods of unequal accuracy for a group of persons, the findings from the less accurate method will have a greater dispersion, that is, there will be a larger number of extreme values, than the findings obtained by the more accurate method. For example, in the above mentioned papers on ascorbic acid determinations on macro and micro samples of plasma by the photelometric method, it is shown that by the macromethod the determined ascorbic acid concentrations at 0.40 mg. per cent had 95 per cent confidence limits ($\pm 2 \times$ standard deviation for experimental errors) of .40 $\pm$ .08, or .32 to .48; but by the micromethod the 95 per cent confidence limits were .40 $\pm$ .17, or .23 to .57. Similar or greater differences in reliability of determinations of ascorbic acid were found for all other levels. These values are, of course, for the procedure as used in the New York City survey of high school students. On the basis of these confidence limits, if one hundred children with plasma ascorbic acid levels of 0.40 mg. per cent were examined by both the macromethod and the micromethod, there would probably be only one reported value of 0.30 mg. or less in the macro series, but there would be about twelve such values in the micro series, and one of these might be 0.20 mg. or less. Thus, a comparison of prevalence in two groups of any biochemical value may give a misleading result unless it is known that values were determined with similar accuracy.

Precise comparability in the accuracy of the same procedure in different laboratories cannot be expected since the error is greatly influenced by the skill and care of technicians. Only by an analysis of the errors in its own laboratory can a research group properly interpret their findings. It is desirable, in fact it is essential, that the errors in a procedure as used in any study or survey be reported so that the findings in different studies can be compared.

In the study of anemia, statistical methods have been applied to some extent, but the statistical aspects of the problems involved in establishing standards for diagnosis and classification of types of anemia have not been fully appreciated. Here too, statistical evaluation of the accuracy of specific methods is needed and the limits of the normal biological range for hemoglobin concentration, the number of red cells and the size of red cells should be more carefully studied. The clinicians' attitude has been to be content to diagnose only the severe cases of anemia in which the hemoglobin level is subnormal by any method or any standard. For the detection of cases of moderate hemoglobin deficiency, better standards for normal values must be available and accuracy of determinations should be known.

The present unsatisfactory status of our knowledge of average hemoglobin levels which are the basis for so-called normal levels may be illustrated by mentioning the findings from a number of surveys. For adult males, mean hemoglobin values reported have varied from 12.22 gm. per 100 ml. for an urban group in Pennsylvania [4] to 17.00 gm. for a group in New Orleans.[5] Average values for men in the majority of surveys have been between 14.5 and 16.0 gm. without any clearly evident central or modal average value. For 2,095 males in the New York Metropolitan area, an average hemoglobin level of 14.6 gm. was reported [6] but in our studies of New York groups, for 79 WPA workers the average hemoglobin level was 15.36 gm. and for 120 boys 18–19 years of age the average was 15.30 gm. In a recent survey of 1,170 aircraft employees in Burbank, Calif.[7]

the average hemoglobin level was 14.61 gm. and Osgood [8] has reported an average value of 15.8 gm. for adult males in Portland, Ore. Although a variety of methods differing in accuracy have been used in these surveys, the wide range in means must reflect either systematic differences in the methods or real differences in the populations surveyed or a combination of both. The data cannot be interpreted, but it is very probable that procedural differences account for much of the variation in group means.

Careful study of the sources of procedural differences which cause such marked systematic differences in hemoglobin determinations by different investigators obviously is needed. It is not entirely a statistical problem, but the coöperation of statisticians with technicians on problems of calibration and sources of differences might result in better standardization of methods or at least in some method for equalizing or comparing results of different procedures.

Implicit in the problem of detecting mild and subacute conditions, whether by biochemical tests or by clinical signs, is the need for well defined standards for the normal or healthy state. So long as a deficiency disease was diagnosed on signs and symptoms associated with obvious disease, disability, or disfunction, a normal condition was assumed in the absence of such evidence. On this basis, the normal state of tissues and other physiological conditions showed considerable variation from person to person and these variations were not considered as having significant health implications. Now that research is showing that certain supposedly normal variations are produced by inadequate supplies of various nutrients, and can be modified by supplying greater amounts of the nutrients, the criteria for the normal state are being changed. However, since these bodily conditions which can be shown to have a nutritional cause are very prevalent among apparently healthy persons, their ill effects must be determined. Little evidence from human studies is available and intensive studies are needed to demonstrate what are the deleterious effects of mild deficiencies and what benefits or improvements in health are experienced from optimal nutrition.

In investigations on the relationship between nutritional status and health or between nutritional status and other factors such as physical efficiency, learning ability, etc., there will be opportunity and actual need for the advice and assistance of statisticians in planning experiments, in analysis and interpretation of results. Essentially these will be studies in which differences are to be measured and evaluated, and this is a statistical procedure. The statistician should have a part in making the plan, in determining what variables are to be controlled or measured and how, and in deciding methods for measuring or classifying the criteria by which effects are to be judged.

The potential field of study on effects of lowered nutritional status is very broad. In respect to health, the possible relationships are many and there is little evidence to indicate what signs of ill-health are most closely associated with deficiency states. Specific deficiencies may increase susceptibility to specific diseases or contribute to the development of degenerative diseases at an earlier age. Many of the so-called minor complaints and symptoms, such as digestive upsets, headaches, and nervousness may be caused by nutritional disturbances. Absence of disease and specific symptoms are not entirely satisfactory criteria for health. Dr. Ryle of Oxford, writing in *The Lancet* [9] on "positive health," said "The healthy man is the 'whole man,' whole in functional regard, in the enjoyment of his faculties and well

adapted to his environment." Can these qualities of the healthy man be measured and the effects on them of nutritional inadequacies be evaluated? Other characteristics suggested as related to nutritional status include efficiency, physical performance of various types, endurance, and learning ability. Clearly, the unfavorable effects of lowered nutritional status may be manifested in a variety of ways. Furthermore, these effects may be operative or apparent only if the subject is exposed to the effects of certain conditioning factors, such as infections or toxic materials, physical strain or severe exercise, growth, pregnancy, climatic factors. Properly controlled studies on human subjects will necessarily be difficult to conduct, and results are more likely to be expressed in significant tendencies or group differences than in evidence of uniform or consistent effects for all individuals. Studies in the past have been handicapped by the lack of valid criteria for classifying the nutritional status of subjects under experimental observation. With suitable diagnostic tests for the major deficiencies, studies of the relationship of nutritional deficiency to health and other attributes may be conducted under conditions which are more satisfactory and more likely to yield definite results.

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X-Ray in Health Week

The 50th anniversary of the discovery of x-rays will be the basis of a nationwide educational program during the week of November 5 to 10 to familiarize the public with the importance of radiology in everyday health, Dr. Lewis G. Allen, Chairman of the Commission on Public Relations of the American College of Radiology, has announced. He pointed out that despite the widespread use of x-rays by the medical profession, large sections of the public are completely ignorant of the invaluable aid radiology has been in the prevention, diagnosis and treatment of disease.

Health Education in Hospitals and Outpatient Departments*

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FOUR years ago the walls of the Johns Hopkins Hospital in Baltimore became a tool for health education. Begun as a volunteer project under the sponsorship of the Food Clinic, the experiment described here was taken over by the Department of Preventive Medicine in the summer of 1941.

The experiment shows in miniature what potentialities for health advice and instruction lie in the untold miles of bare walls and corridors to be found throughout the country in our outpatient departments and hospitals. It attempts to remedy a situation familiar to all who have worked in clinics. Patients in our dispensaries sometimes wait hours before they receive treatment. And we have let them sit, with nothing to distract them from a deepening preoccupation with themselves, nothing to stimulate their interest in the possible causes of their illness, the prevention of future trouble—except others around them equally anxious, equally uninformed. Anxiety mounts as they wait. They are in the mood to appreciate sound health advice. Yet in centers that contain for the layman everything authoritative in the field of health information, we permit these large audiences to go untaught.

THE BEGINNING: A VOLUNTEER PROJECT, SPONSORED BY A SINGLE CLINIC

In its own quarters in the Outpatient Department of the Johns Hopkins Hospital, the Food Clinic for a long time has practised its belief in the quick teaching value of exhibits and circulated good available commercial leaflets, as well as material of its own making, among its patients. In the fall of 1940 it sponsored the initial exhibits of this experiment—the Vitamin Series—six by five foot billboards, using raised lettering, carefully thought out for color and design as well as statement. The boards were hung in a main corridor of the Outpatient Department, one each week, behind a demonstration table which displayed the listed foods containing the specified vitamin. Taking advantage of the interest with which any information about vitamins was received in those days, the boards sought to sell the idea that vitamins come in food as well as pills—and much more cheaply. The splash of bright color in the gloom of the dispensary and the pertinent information drew groups of people to the tables and caused considerable comment, which did not go unnoticed by the hospital staff.

Several months before the National Nutrition Conference spearheaded the drive for what the whole country recognizes now as "The Basic 7," a bookcase display was set up, on whose

* Based on a paper presented before the Public Health Education Section of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

† Now with E. R. Squibb & Sons, New York, N. Y.

shelves wax models demonstrated the five basic food groups from which servings should be chosen every day. Upon request, it was made portable for use in other parts of the hospital. Also upon request, it became a permanent exhibit, hung beside the information desk. Daily, for nearly four years, its racks have been refilled with the latest leaflets on food, and on ways to cook and conserve it.

EDUCATION OF THE STAFF IN A NEW TEACHING MEDIUM

One of the immediate problems facing this particular teaching medium was to break down people's conception of it as solely a way to put across food information. Food demonstrations and posters are not new. The "year of preparedness" saw a tremendous increase in poster material for use by lay groups. Food exhibits have long had a respected place in the Boston Dispensary. But the use of this medium to teach other aspects of preventive medicine was another matter. Therefore mute instruction of the staff in the use of this tool was begun. An exhibit on baby clothing appeared in the Harriet Lane Dispensary, sponsored by the Harriet Lane Social Service Department and the Visiting Nurse Service. Beaverboard cutouts of babies were dressed in the actual clothing that comprises the layette and gazed out on the benches in Prenatal Clinic from a six by five foot board, that carried a minimum of text. The giant red and black cutout figures that illustrated the first cooperative venture with Orthopedic Clinic scared a number of people when they came around the corner too fast, and taught us some of the "don'ts" in presentation technique, but it carried on this education with its listing of common complaints under the heading, "Is One of These You? Aches and Pains Can Come from Bad Posture."

Healthy Hebe, namesake of the Greek goddess who kept the Olympic deities eternally young on a diet of nectar and ambrosia, appeared early on a wall outside the dining rooms of the nursing staff. Pert and decided in her notions, her tri-weekly "Healthy Hebe Says . . ." not only brought to their attention simple health situations and the demands of the civilian war effort, but also a pictorial way of teaching which they could apply to their own purposes. Only as the staff becomes better trained, however, in recognizing the place of health teaching in the clinics, will any program of health teaching aids be successful.

In an encouragingly short time exhibits found their way into the classroom. A four by five foot exhibit telescoped an hour's discussion for student nurses on the preparation of and equipment needed for the Baby Formula. It was put on wheels so that the nurses could roll it in the wards when giving the same talk to the homegoing mothers in Woman's Clinic. It was planned so that it could be easily taken apart and transported by auto if borrowed by a city clinic. A sign below it said, "Every item on this exhibit was bought in the 5 and 10," for that was in 1940. It followed a policy we still pursue, that instruction be of equal value for all levels of our audience, but no demands be made that could not be met by people with restricted budgets.

THE FUTURE HEALTH EDUCATION PROGRAM WILL BE INTEGRATED, INTER-CLINIC

It became evident that two dispensary programs could be evolved out of the proper use of this medium of visual education, one fitting inside the other. Each clinic in the Outpatient Department had important preventive knowledge to contribute to the Outpatient Department as a whole. A visual lecture on foods that help the teeth hung in Dental Clinic; knowl-

edge of the use of the x-ray, "Spot TB before It Spots You," found receptive audiences elsewhere than Chest Clinic. Such pooled information can not only clarify the work of the clinics, but at the same time offers the patient needed insight into the healthy functioning of his body as a whole. Special teaching problems within the clinics themselves required a type of poster that met specific situations and needs of interest only to a small clinic group. One such poster was our "poker hand," illustrating on each tremendous card a rule of particular importance to the diabetic —"Diabetic? Do You Hold This Winning Hand?"

One November day the following went up in different parts of the Outpatient Departments:

"Don't Spread a Cold"
(simple rules for protecting others—a 4'x5' copy of an 8"x6" poster of the National Tuberculosis Assn.)

"At the First Sign of a Cold . . ."
(proper use of nosedrops to block the spread of infection to sinuses and ears)

"Don't Be a Cold Gremlin"
(absenteeism due to lack of protection of self and others)

"Block Every Kerchooooo! Help Check Grippe and Flu."

Patients going from one clinic to another had one point brought home to them in various ways, and the repetition served to break painlessly through preoccupation. With proper personnel and greater organization, one can see as an outgrowth of this attempt at coordination an outpatient program so organized that when the season of the year or local health problems demand a drive, the material on all the walls will strike home a single message from a number of different angles.

"TECHNICAL" CONSIDERATIONS AND THE GROWTH OF A LENDING LIBRARY

A "calendar" of displays became necessary which now, over the four year period, shows an impressive rotation of exhibits throughout the Outpatient Department. There have been as many as thirty-two exhibits up at one time, and we kept to the rule that no display should remain in one place longer than a month. Pertinent leaflet material should go with each one, but lack of quality and quantity, as well as lack of personnel, has kept this too much of a theory.

The paint and equipment needed to construct the three-dimensional poster cost startlingly little: cold water paint in quart and gallon cans, a few brushes, beaverboard, and homazote for both backgrounds and letters, bits of material, pipe cleaners to make figures for dioramas, hammer, screw driver, coping saw, and, after awhile, an electric jigsaw. The carpentry for most of the exhibits, from the beginning, was done with the help of Henry Phipps Psychiatric Clinic's carpenter shop. We know from continuous experience that patients have gained a great deal of satisfaction from feeling they might be helping other patients.

Two complaints against exhibits have been that they are expensive and they take up room. The materials and the technique used disproved the first complaint. The making of a blueprint, so that dismantled exhibits could be resurrected in a couple of hours, as well as reproduced in any quantity desired, opened up new possibilities for a lending library that could grow with each new exhibit made and become of use to the community. When "boxed," ten exhibits can fit on one small shelf.

It became necessary to think of exhibits in terms of their portability. When a defense plant and a school asked us in the same day if we could make Hebe posters for them, and requests for material began to come in from the community and from organizations in other states, we became aware that our program could serve a far wider audi-

ence than our hospital one. A traveling exhibit made for the Maryland State Department of Health was designed to travel as easily as a very light suitcase, so that a field worker would not leave it behind "accidentally on purpose" because of its awkwardness in handling and setting up. Frames, into which beaver board could easily slide, were designed with interchangeable units, that could be sent by mail cheaply, without being crated or damaged. Miniatures appeared: "How Do You Eat?" a variant of the "Basic 7"; and "Baby Eats to Grow," which showed the mother when and how baby's diet is expanded. Called "bench" or "bedside" exhibits, their extreme lightness and smallness allow them to be used for individual instruction by the nurse, social worker, or nutritionist, when talking to a patient waiting on a bench in one of the clinics or lying in bed on one of the wards.

Aside from the blueprint, we stumbled upon the fact that exact copies of our displays could be made by enlarging the scale of our photographs, as was done with "Regular Hours for Baby" (El Reloj Que Marca La Salud De Su Bebe) in Bogota, Colombia. When our photograph album was microfilmed by the Office of the Coordinator of Inter-American Affairs, a large group gained access to these ideas.

TEACHING MEDIA CAN BE MANY AND VARIED

We have used demonstrations, exhibits, dioramas (in our "allay panic" series on civilian defense), posters, leaflets, photographs (for example, the British Information Services' series on Penicillin). The radio and the record in our present setup are impracticable, though publicizing the community's radio health dramas is something else we can do. The most important visual medium of all, the teaching film, needs facilities for which hospitals and clinics have not yet arranged, and there are no places that I know of where patients can see movies while they wait. Some day, perhaps sooner than we think, television will be utilized. We did buy an automatic slide projector and set it in a mobile stand that would allow it to project pictures onto the portable screen at a height to let seated people watch the slides undisturbed by passersby. Only a few pertinent filmstrips were found that could be converted into slides, so we made one experimental series of Kodachrome slides ourselves, "Eating Is What You Make It," with the help of material lent us by the *Woman's Home Companion*. Due to the lack of material and lack of personnel, we have used this machine only to prove its possibilities instead of as a natural part of our work. Its advantages are that it holds forty-eight slides, works automatically and simply, and can be used in a small area without drawing shades or putting out lights. It has been tried on the wards of Woman's Clinic as well as in the dispensary to see if its movie qualities would attract the convalescing ward patients. It did.

AN EXPLANATORY EXHIBIT CAN REASSURE AND PROMOTE A MORE COÖPERATIVE ATTITUDE

The whole idea of exhibits for use on the wards *is* provocative. Patients often do not understand that the tests they are given are ward routine and not a sign of new complications to their illness. And a busy staff cannot always stop to explain, even if it senses the need. An explanatory exhibit of the blood count, for example, contains strong elements of mental hygiene to recommend its use here. This need for reassurance and clarification of unfamiliar procedure finds a like need where registration takes place. Having to wait, and not knowing why the wait

is so long causes anxiety. People believe they have been forgotten, or hopelessly entangled in red tape. No layman understands why, when he comes to a hospital in the emergency of sickness, he is not rushed to treatment immediately. We set up a large three-dimensional poster in front of registrants, which says in large type, "Thanks for Waiting. Registration Takes Time." It explains pictorially the rather devious route by which a registrant finally arrives in a specific clinic. We tried at least to show him what causes delay, and introduced him to a new idea, the administrative problems of the clinic. We expect preoccupation in our audience. We are used to apathetic people. But we know also that they grow antagonistic if they have waited long enough. These billboards can serve as silent salesmen of good will as well as health, and the staff may find a more coöperative, confiding group of patients.

RÔLE OF THE HOSPITAL AS A HEALTH EDUCATOR EXPANDS

New responsibilities developed. We wanted to present more concrete help to our audience, and the general health rules became more specific. Instead of "exercise some every day," we asked the Department of Public Recreation to give us material for "Fun Near Home," a recreational map of Baltimore, made vivid with easily recognized symbols. Food demonstrations shared interest with "Blame the Rat, Carrier of Disease," "Meet Toxoid, the Lifesaver," "Is Life Tearing You to Pieces? Learn Why and Get into the Driver's Seat" (in co-sponsorship with the Henry Phipps Psychiatric Clinic), "Get Rid of the House Fly. He walks where diseases breed and gives the germs a free ride to your food . . ." (in co-sponsorship with the Department of Parasitology). We began a file of the available health education material in the country, so that when people asked us for help, we could direct them to the agencies, commercial and otherwise, that were printing, painting, filming health information. The great need for a clearing house, a selector of some sort, to bring order out of chaos, was brought home to us. The need for more people equipped to utilize and distribute this available material is obvious, too. We have material. We have an interested audience. Who are going to act as the middle men? We believe that as this branch of health education expands and takes on order, there will commence a healthy swapping around the country of the material worked out so carefully by specialized groups, and that a department such as ours can act as one of the middle men.

A class, as part of the course in "The Social Aspects of Nursing," was begun a year ago last February for student nurses who were working in the Outpatient Department. One of the tools of health teaching stressed in this course is the potent one of friendly conversation. Both the use and abuse of visual aids were discussed. The use of posters and leaflets to highlight problems found in the dispensary gave concreteness to the discussion as well as showed how sparse still is the material with which we can work.

CONCLUSION

By trial and error we learned about our audience. We were encouraged by their interest and appreciation. We also found out something of how shy they are, and uncertain about their right to ask questions and to move freely about. We learned from our patient-participation exhibits that people are reluctant to do things in front of other people, like pulling open a door to face a mirror, in "Who's Responsible for Your Health?"—so care should be taken in how they are used. The same

shyness demands that an exhibit, to give a true story to everyone, should say as completely as possible what its point is in letters large enough to reach back into the waiting room.

In conclusion, certain things must be pointed out. The idea is still an experiment, not a policy. Indulgence, rather than active participation, is still the more usual attitude. Many of the staff do not recognize that the hospital has added to its responsibility for curing its patients a new one, one that can affect the whole community, that of teaching its patients how to prevent and control illness. No means for evaluating the work has been created yet, and as the program develops, some way must be found by which its effectiveness can be measured and improved. Difficult working conditions, frequent changes in personnel, and limitation of materials have added to the pioneering aspect of the work. However, the experiment has continued under growing encouragement and understanding. It appears to possess an inherent vitality which promises well for the future.

Retirement Association

The National Health and Welfare Retirement Association, New York City, went into operation October 1, covering the first 5,000 health and welfare workers to enroll. According to Gerard Swope, Chairman of the Board, workers in more than 75 cities are included in the first 5,000. The purpose of the Retirement Association is to help workers in health and welfare agencies who are not now included under Federal Social Security to provide income after retirement age on a contributory basis. Among the types of organizations whose employees are protected by this plan are hospitals, nursing organizations, orphanages, family welfare societies, homes for aged, recreation associations, Girl Scouts, traveler's aid societies, legal aid societies, and tuberculosis societies.

Health Education Methods of the Red Cross

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SINCE the war began, the Red Cross has given first aid certificates to 6,839,000 people. Home nursing certificates have gone to 1,192,000 homemakers (both men and women) as well as school and college students. Another 455,000 persons finished a 20 hour course in nutrition, and some 141,000 were trained to serve as nurse's aides.†

These samples reflect, but do not fully picture, the magnitude and scope of the health education activities of the American Red Cross. If I presume to outline some of the methods employed, I do so as an interested bystander, only indirectly connected with these services.

The war, of course, stimulated the rapid expansion of Red Cross educational work, but the basic pattern for it had been worked out quietly and patiently over a period of some 35 years.

The courses in first aid, water safety, nutrition, and other subjects, all follow this pattern, but for purposes of illustration I shall comment particularly on the home nursing course, because it was the pathfinder and because this particular course is of most significance to the public health worker.

The home nursing course is designed to train the homemaker in simple methods of caring for the sick and in safeguarding the health of the family. It does not qualify one to perform a public service; it is not a substitute for medical or nursing care. In short, home nursing is a special homemaking skill. It includes not only skill in emergency care of the sick at home, but also skill in maintaining a healthful household. The home nurse is the monitor of health in the home. Since there is hardly a public health problem which does not reach into the home, the value of training annually some half million persons in home nursing in as many American homes can hardly be overestimated, for each of these monitors has at least learned the fundamentals of health protection, and each will be responsive to the leadership and sensitive to the suggestions of the health officer. Home nursing is the essence of public health applied to the individual in his daily living. The course is elastic. The emphasis may easily be shifted from one subject to another, according to the needs of the day and the geographic locality or to pressing current health problems.

The historical background of home nursing throws light on its present status. In 1908, Mabel Boardman—one of the first members of the Central Committee—enlisted the aid of several nurses in the District of Columbia to give a series of lectures and demonstrations to the women of Washington on Hygiene of the Sickroom, Dietetics,

* Based on a paper presented before the Public Health Education Section of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

† The figures in this paragraph are for the period of January 1, 1942, to July 1, 1944.

Tuberculosis, Contagious Disease, Mother and Baby Care, and Medical and Surgical Emergencies. These lectures were popular at once, but drew the criticism of those who feared such training might lower nursing standards. With this in mind, leaders in nursing were asked to outline a course which could safely be given to women for home use. Jane A. Delano, first director of the Red Cross Nursing Service, saw the possibilities of the course and planned a textbook which appeared in 1913 as *Elementary Hygiene and Home Care of the Sick*. Red Cross chapters all over the country promoted the course, and the number of classes grew so rapidly that many chapters found it necessary to set up "teaching centers."

The first World War gave added impetus to the enterprise. As the demand for classes spread in ever-widening circles, the need of training persons to teach the course came into sharp focus. Personal, centralized control was no longer possible, and this led to the preparation of the teacher's manual, *Guide for Instructors of Classes in Home Hygiene and Care of the Sick*, first published in 1920.

Twelve years of post-war lethargy followed, with a decided drop in the number of home nursing classes. Then, in 1933, home hygiene joined the march with the adult education movement. The Red Cross, with its ready-made channels for reaching large numbers of people and with a study outline that had stood the test of time, coöperated with other agencies, particularly those supported by federal funds, and soon great numbers of people, struggling with unemployment problems, welcomed the opportunity of attending classes in home hygiene. In 1933–1940, 61,885 certificates were issued to those who had completed the course.

Again, in 1940, the war suddenly accelerated the demand for training in home hygiene—the old course was streamlined and given a new name: "Red Cross Home Nursing."

This brief recital brings out the basic design of the course, the elements of which are:

1. *Discovery of the need for a certain body of knowledge and the groups who need it.* In 1908, when visiting nurses were still charting unknown seas, it was becoming apparent that an important function of the nurse is to teach. Homes stalked by sickness were handicapped usually, not only by poverty but also by lack of knowledge and by ineptness. Mothers had to be taught the most elementary technics of caring for the baby, of quarantine practice, of feeding the family. The trail had been blazed by Sir William Osler, who introduced the practice of sending a young woman medical student to the homes of his tuberculosis patients to help them carry out the doctor's orders. But the discovery that housewives generally are in need of knowledge about health was a notable one—and it led to the next step, namely:

2. *The selection of the subject matter.* To cull out of the vast body of medical knowledge those fundamental principles which are pertinent to the needs of the layman requires mature judgment. No greater challenge confronts the health educator than that of determining what to teach and what to omit. What must a mother know in order to distinguish between health and sickness? What are the essential facts she should know about nutrition? What nursing technics may she safely practise? The temptation of the enthusiastic teacher is to share with her students the detailed knowledge which fascinates her, and only by rigid discipline is she able to select that which is of pragmatical value. By the trial and error method, Miss Boardman and her successors have threshed the grain, but the process of refining and revising subject matter still goes on.

3. *The Home Nursing Textbook* is written in simple language which avoids the use of technical terms as much as possible. Repeated revisions have not yet made it flawless, but it is generally sound. After the course is finished, the textbook remains in the home. The health worker who values the power of the printed word and understands the difficulty of distributing it wisely, will acknowledge that the placement of a half million books in as many American homes during one year is, of itself, a mighty accomplishment.

4. *The preparation of qualified teachers.* The great demand for instruction in home nursing and the shortage of well prepared nurses have made it difficult to maintain the high quality of teaching which the Red Cross desires. Only persons who meet certain standards of academic and professional education are authorized to teach. If the instructor is a volunteer, she must be a graduate of a recognized school of nursing and registered in at least one state, and if she has had experience in teaching, so much the better. Paid instructors should, whenever possible, have completed a year's study, or its equivalent, in public health nursing in a university program approved by the National Organization for Public Health Nursing. In communities where there are several instructors, their work is usually supervised by a director of Red Cross Nursing, who meets rigid standards of training and experience. In short, instruction in home nursing is given by persons who are recruited, trained, and directed with meticulous care.

5. *The organization of classes* is the responsibility of chapters, of which there are now 3,756 in the United States. Back of that job is the incessant and demanding task of promotion. Classes do not crystallize out of the void. To persuade people to enroll calls for publicity skill and resourcefulness. Finding candidates to undertake the teaching job is a year-round activity. Arranging suitable hours, finding a place in which to assemble classes, providing the equipment, and keeping all on schedule is no mean administrative task.

6. *The teaching is done primarily by actual practice.* Students learn to do by doing. Each technic is demonstrated by the instructor; then the student is expected to "give it back." Naturally, the classroom is equipped with the necessary articles and supplies, such as bed, blankets, hot-water bottle, thermometer, etc. Whenever practicable, improvised equipment is used, and students are encouraged to use initiative in devising their own substitutes for sick room necessities and comforts. A certain amount of didactic instruction is, of course, also given, and teaching aids, such as charts and movies, help to supplement the lessons.

The present war emphasized the need for a short course. Because of the decrease in doctors and nurses available for civilians, a course titled "Six Lessons in Care of the Sick," streamlining basic nursing procedures, was developed for groups too busy or hard to reach to make the standard (24 hour) course practical. In this course one method only is taught for each technical situation. There may be many ways of making a bed, but you may be sure that if you are cared for by a home nursing student in Maine, your bed will be made comfortable in precisely the same way as it would be in California. Standardization of teaching material admittedly has its disadvantages—it is inelastic and not conducive to student exploration, but that is outweighed by the necessity of avoiding confusion in the mind of the student, for technical training is, of necessity, authoritarian. There is free scope for group discussion, however, and for independent thinking when the subject concerns general principles of health conservation.

7. *Students are given a certificate when they have completed the course.* The Red Cross has learned from experience that successful learning effort must be rewarded or, at least, recognized. The certificate awarded to the home nursing student is highly prized by the winner, even though it does not entitle her to wear a uniform. The certificate does entitle her to wear a Red Cross home nursing pinafore (cover-all apron) and a Red Cross home nursing pin. She may volunteer to serve recognized community agencies if her interest in service extends beyond the limits of her own home. Home nursing volunteers are giving assistance in such services as public health nursing agencies, clinics, hospitals, and blood donor centers.

The hope of winning a certificate is an incentive to faithful study, but perhaps not strong enough to attract many people. Therefore, other incentives are needed to supplement the desire for a certificate—incentives which, in my estimation, are more substantial. Among them, I should place highest in the list the promise of acquiring skill. Pride in one's job is a powerful motive. Running a household, sick or well, is drudgery unless one enjoys the satisfaction of doing it well. What woman's bosom does not swell with pride when she is called by a neighbor to assist in a task for which she has a knack—whether it be to flavor the apple butter, hem a skirt, or give the baby an enema. The satisfaction of knowing how to take temperature, how to make a bassinet, how to make a bed with a patient in it is, perhaps, the best reward offered the home nursing student.

Such is the overall design of the health education methods of the Red Cross. It might, with variations, be just as well illustrated by other examples, such as the courses in first aid, nutrition, or accident prevention, all of which prepare the student for "service" to others and, at the same time, help him to meet his own health needs. The home nursing course has the added advantage — potentially, at least — of making "every home a health center," responsive to health and medical leadership. The training given is not haphazard, but carefully conceived, systematically applied, and wisely administered.

For many problems of public health, perhaps, these methods are not applicable. Red Cross courses deal with subjects that are more or less concrete, delimited, tangible. Many health educators, however, have the more difficult task of arousing interest in subjects which, to the public, seem abstract or theoretical. It would certainly be impracticable to depend upon formal courses of study to cover all aspects of public health. Moreover, there are many people who cannot be persuaded to take courses of any kind. Yet one wonders if health educators might not be more ingenious in applying the educational principles that do work, to such problems as the prevention of diphtheria, tuberculosis, syphilis, the conservation of eyesight, the rehabilitation of the handicapped, and the promotion of good public health practice generally.

Certainly the time has passed for the kind of shotgun publicity which blazes forth without definite aim and in the hope that here and there a shot will find its mark. The pamphlet, the newspaper article, the movie, and the radio have their functions, but these—alone or in combination—might well be supplemented by the more intensive form of education in which the student participates and which demands his best effort.

Utilizing Medical Social Service in a Venereal Disease Clinic

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ON April 15, 1943, a medical social worker was placed in the Medico-Legal Clinic of the St. Louis Venereal Disease Control Service, for an experimental period of one year, to study the case work needs of young girls who were brought to the clinic for examination and for treatment of venereal disease. The medical social worker was to interview selected patients, determine their needs, evaluate their capacity for redirection, and refer them to appropriate social agencies for continuing service.

This was a demonstration project sponsored by the Social Planning Council of St. Louis and the St. Louis Health Division. It was financed jointly by United Charities which paid for the professional services, and the St. Louis Health Division which supplied the secretarial and administrative costs. A committee on "Social Protection for Young Girls," composed mainly of representatives of social agencies, supervised the general direction of the program. A smaller Technical Advisory Committee gave counsel on the medical-social aspects.

This is a discussion of the activities of the medical-social worker in this Venereal Disease Control Clinic; it is not a recording of case work process. The purpose of this paper is to show the way in which medical-social service adapted itself to this venereal disease clinic.

The St. Louis Venereal Disease Control Service operates under a good city ordinance which has been in effect since January, 1939. The Service maintains two clinics for the diagnosis of venereal disease: (1) the Diagnostic Clinic to which persons come voluntarily for examination and diagnosis; (2) the Medico-Legal Clinic to which are brought or referred by law enforcement officers those girls who are found to be sexually promiscuous and who are, therefore, good candidates for examination. Discussion here will be limited to the Medico-Legal Clinic since it was to this clinic that the medical-social worker was originally assigned.

The majority of the girls in the Medico-Legal Clinic were apprehended and detained by the Morality Squad and the remainder by other officers of the St. Louis Police Department. A girl was apprehended on the street, in a tavern or in a hotel at any time her behavior was such that the arresting officer had reason to hold her for "investigation" or for a specific charge. The officers usually questioned the girl at length before taking her into custody. They might take the girl to the district police station for further questioning and detain her there over night, or, take her to the Holdover (the temporary detention quarters at Central District) for investigation and detention. If the girl gave a St. Louis address that could be verified she may have been released

to go home, but was given a notice to report to the Medico-Legal Clinic the next day. Copies of the police reports were brought to the clinic the following morning.

All new patients had blood taken for a Kahn test by the clinic nurse, then a pelvic examination was done by the clinic physician. The clinic physician interviewed each new patient but limited his interview to questions about previous treatment and the extent of the patient's sexual promiscuity. If the girl's first tests and examinations were negative, she was allowed to leave but was given appointments for two more examinations. Each girl had to have three negative smears and cultures and one negative blood test before being released by the Health Division.

At the beginning of the demonstration program it was agreed that the medical-social worker would select her own cases, limiting interviews to (a) girls in the younger age group and (b) those with outstanding problems. Cases were selected by screening the police reports and observing the girls in clinic. Medical histories were available in many instances at the time of the interviews. The interview was begun at the point which seemed most important to the patient but as it progressed facts were discussed relating to family history and relationships, school and work adjustments, patient's interests, activities, and plans for the future. These interviews together with the medical-social worker's observation of the girls in the clinic revealed many enlightening facts about the patient group which have been analyzed.

The clinic patient load was made up largely of girls and women who were chronic offenders, 66 per cent of them having been arrested before. Likewise, 70 per cent of them were in the older age groups. Since selection of patients was planned with the intent of getting the most hopeful prospects for case work, it is not surprising that this was the first arrest for 91 per cent of the selected patients, and that 64 per cent were under 21 years of age. Many of these girls at first indicated complete satisfaction with their way of life, but as the interview progressed they were able to express their discontent and their desire for help. The majority of patients had been thought of as prostitutes and they had received little individual consideration during examinations. The study of the total Medico-Legal Clinic patients showed that only 10 per cent were prostitutes, while about 30 per cent were underprivileged and misguided girls under 21 years of age. They had been denied the love and security of a normal home and were seeking excitement and attention.

One of the most important revelations of the interviews was the general resentment toward the authority that was responsible for the girls' apprehension, detention, examination, and hospitalization. This had been evidenced in their general behavior, their aggressiveness toward the policemen who accompanied them to clinic, and their protesting their innocence to all clinic personnel. Those who had been detained over night had refused to eat the bread offered them for breakfast, and they made themselves as disheveled and dirty as possible. A further expression of their resentment was brought out in their failure to keep return appointments. Patients with money purchased food for breakfast from a vendor in the building which increased the dissatisfaction of those patients without funds. By the time of examination in the clinic, the new patients had already received misinformation from the chronic offenders about the total Venereal Disease Control process.

With some insight into the reasons behind the patients' unruly behavior the whole clinic personnel worked together to correct some of the causes.

The first step was the separation of old and new patients in the waiting room. Since there were usually only 6 or 7 new patients per day, this gave the nurse an opportunity for a more personal contact with them. She interpreted the reasons behind the Venereal Disease Control Program and could more satisfactorily answer the patients' questions. A policewoman was brought into the picture to see that the patients cleaned up before leaving the Holdover and she accompanied them to the clinic in order to be of service. Increased privacy during examinations was the next step in improving the dignity of the clinic.

Approximately 75 per cent of the total Medico-Legal Clinic group failed to keep return appointments, whereas the selected patient group seldom failed to return. It was felt that the selected patients were keeping appointments because they were given a better understanding of the need for reëxaminations, and they were helped to plan for these. The interviews revealed that many girls who were new to the city and who had been brought in by the police did not even know where the clinic was located. An appointment system was tried. Mimeographed slips were given to the girls containing name, address, and telephone number of the clinic, with space for date and time of next examination. At the time the appointments were given, each girl was asked whether or not she could return on the dates specified, and she was requested to notify the clinic secretary by phone if anything should arise to prevent her return. This resulted in a 50 per cent decrease in broken appointments for the total patient group.

In the past, many patients on learning of their infection and the immediate hospitalization that was to follow, brought up many social problems to make hospitalization seem an impossibility. The well behaved patient received an apologetic referral to the hospital, but the troublesome patient was given to understand that the rules were made for her. The disgruntled patient usually managed to escape from the hospital within a few days after her arrival. She was then reported to the police department for arrest on a charge of breaking quarantine and, if found, was sentenced to 60 or 90 days in the workhouse where treatment was completed. Talks with these patients revealed their complete lack of understanding of their illness.

The study of selected patients showed that the majority of them had less than highschool education and the intelligence level of many was questionable. Many of them were infected repeatedly, which pointed up our failure to put across medical information at their level of understanding. This meant that these patients needed a particular approach to their problem and greater understanding and patience on the part of the clinic personnel in dealing with them. With this understanding of patient behavior came an awareness of the clinic's rôle in stimulating certain reactions in patients. It also raised questions about other health, welfare, legal, and military aspects of the program and encouraged interest in experimenting with problems of patient management. Through closer working relationships between all the agencies concerned in the control program came greater understanding and acceptance of the rôle of each. The police prepared the arrested girls for the clinic, and the clinic staff accepted the validity of each arrest. The Supervisor of the Venereal Disease Control Service was able to point up the responsibility of the Venereal Disease Control Service to the community as a whole, which enabled the staff to accept their duties and sell the idea to the patients. The police who accompanied the girls to clinic were finally withdrawn from the clinic to serve a more useful purpose

in the community. The duties of the policewoman were increased to allow for investigation of, and services to, the girls in the clinic. With the release of rationing of coffee, breakfast was served to the girls in the Holdover, and they ate it, knowing the clinic was no longer an eating place. With the establishment of a new Rapid Treatment Center, transportation to that hospital was changed from the Police "Black Maria" to the stationwagon furnished by the hospital.

A better understanding of the patient group not only brought about improved patient management but was effective also in clarifying the social needs of these patients. For the young, non-infected girls prevention and protection was needed. About one-third of the selected group indicated that their present behavior was not in keeping with their established pattern, and they were able to accept referral for service from another agency or to work out their difficulties with some help from the medical-social worker. A few of them had run away from unhappy homes and wanted to remain in St. Louis; others had come to the city looking for excitement but found it too confusing and wanted to return home. There were illegitimately pregnant girls who needed medical, financial, and social service. Unemployment presented no real problem. There were homeless girls, girls with domestic difficulties, and girls needing supervision and guidance. There were existing social agencies that could meet these needs and the medical-social worker referred the girls to these resources. As the clinic personnel came to understand the nature of the medical-social service they began to make appropriate referrals to the worker, giving her the benefit of their observations of patients.

As the program continued, the medical-social worker extended her activities to the total clinics, but the discussion here will be limited to the 192 patients selected from the Medico-Legal Clinic on whom there is social recording. Only 42 per cent of this group were found to be infected—but all of them had social problems. The policeman or policewoman, who accompanied the girls to clinic or who referred them here, frequently asked the medical-social worker to talk with a girl. They selected girls who were stranded in St. Louis, who were questionable runaways, or who seemed to be at the mercy of unscrupulous relatives or friends. The clinic secretary referred those girls who were difficult to manage at the point of registration or at the time return appointments were given. Patients who showed emotional disturbance while having a blood test or when informed of diagnosis were referred by the nurse. As infected patients learned the need for immediate hospitalization, many social problems came to light and the patient was referred for help in planning hospital care. The clinic physician asked the medical-social worker to see those girls whose medical examination revealed little sex experience or whose personal hygiene was such that the girl was deemed to be a self-respecting individual who could use redirection. They also referred unmarried girls who were diagnosed as pregnant. The investigators referred girls whom they had known as "military contacts" because they thought the girls needed supervision and guidance. Several girls were referred from the Diagnostic Clinic because they were considered potential Medico-Legal Clinic cases. The medical-social worker selected fewer and fewer cases as other personnel referred patients to her. By the end of the year it was found that the worker had chosen only 47 per cent of the total selected patients.

It must be remembered that the pur-

pose of the interview was to determine the girl's problems, her capacity for accepting help, and to bring about her application for assistance from a local social agency when indicated. Each case was cleared with the Social Service Exchange, which is the central registry of all social agencies of the city. In 29 per cent of the cases patients were known to the Social Service Exchange. In a few instances the patients were under care of social agencies; in other instances agencies agreed to resume activity on cases previously known to them.

Nineteen different social agencies coöperated in working with 42 per cent of the 192 patients. A few girls failed to report to the agencies to which they were referred, but for the most part they followed through on the referral and showed a positive response to the service offered. If a girl behaved in an immature fashion, or if the suitability of her living arrangements was very questionable, the medical-social worker assumed major responsibility in getting the patient to accept supervision of a social agency in order to keep out of further difficulties. The medical-social worker accompanied a few girls to the office of the agency accepting referral because it was felt to be in the best interest of the girl. Several agencies reported that in a number of cases the girl's personality was too damaged for her to be able to use the service of the agency. About 5 per cent of the girls were known to be mentally deficient and in need of institutional care, but facilities for this were lacking. These were the girls who became infected repeatedly. Many of them had illegitimate children who had been removed from their custody and were being supported by public funds. For the protection of the girl and society, institutional care seemed to be the only answer, but until such resources are available these girls are being referred to social agencies for supervision.

The Travelers Aid Society accepted the stranded non-resident girls and in most instances returned them to their place of legal residence, after investigation proved this to be the best plan. The girls' protective agency accepted young girls who were in need of close supervision and direction and helped them with this along with suitable housing, employment, and recreation. Family agencies assumed responsibility for those girls whose domestic situations were complex and helped them to find solutions to the problems that were responsible for their misbehavior. An infants' home boarded babies so that infected mothers could be hospitalized. The Public Assistance Agency assumed case work activities with members of their client's family who became clinic patients, and offered financial service and help to others. The American Red Cross accepted the servicemen's wives who were stranded or confused over marital problems. The new Rapid Treatment Center, through its psychiatrist and psychiatric social worker, helped the infected patients who showed unusual emotional disturbance.

Fifty-seven per cent of the selected patients were not referred to social agencies because either the patient or the medical-social worker saw no need for referral. Some of these were girls who had been in the city only a short time but found living in St. Louis very confusing and returned home on their own. Others were resident girls who seemed to make satisfactory adjustments, with some assistance from the medical-social worker. In many cases parents, husbands, relatives, or friends of the girl were interviewed and they were able to carry the burden of responsibility in redirecting the girl's activities. The medical-social worker tried to assure each patient of our continued interest in her and our availability for future help.

The medical-social worker was asked to confer regularly with the supervisor of the clinics on questions of policy and procedures and was used in a consultant capacity by the public health nurses and investigators. Other social agencies used the worker as a liaison person in discussing the medical-social problems of their clients coming to the clinic.

CONCLUSIONS

One year is a very limited period within which to do a demonstration job, to analyze the program and to draw conclusions, but certain things have been shown. The findings are summarized as follows:

1. For good patient management in a venereal disease clinic, there must be an understanding of the patient's social as well as medical problems.

2. Privacy for examination and interviews are important in obtaining a patient's acceptance of medical and social diagnostic procedures.

3. Many girls coming to the Venereal Disease Clinic under the auspices of law enforcement officers are not habitual offenders and can benefit by social services. Many are young girls whose living environment is unsatisfactory and who are deprived of normal parental love and guidance. Many are of low mentality and, therefore, easily influenced. For their own protection and that of the community, these girls needed a supervised environment.

In the group studied only a few of the girls were rearrested. This leads us to believe that more individualized handling and careful explanations, along with consideration of the girl's problem and case work treatment have been conducive to bringing about a change in the girl's behavior pattern.

4. From experience we have learned that a more sympathetic handling of patients makes for better patient coöperation as far as treatment is concerned, and also reduces the risk of spreading the infection.

5. For a successful venereal disease control program it is essential that individuals as well as community agencies and organizations understand the importance of control measures, especially as they relate to protection and prevention.

6. The total coöperation of the law enforcement, health and welfare agencies is necessary for a successful venereal disease control program.

Control of Typhus Fever in Mexican Villages and Rural Populations Through the Use of DDT*

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THIS paper is a progress report on work which represents the contribution of the Ministry of Health and Welfare of Mexico to the study of the control of typhus fever through delousing with DDT in the form of powder. It is a continuation of work which was begun in January, 1943, at the request of the Office of Scientific Research and Development, by Dr. W. A. Davis,[1] who tried delousing with preparations which had pyrethrum products as their base. His work was followed in May, 1943, by a request for the coöperation of the Mexican Government in field studies in the use of the product which is now popularly known as DDT. Provision was made for the release of DDT for a prolonged experiment in which the objective would be to render a community free of body lice and to maintain it in that condition. Later it was found convenient to combine this objective with that of controlling active epidemics of typhus fever.

With the powder which was standard for army use at the time of his experiments, Davis demonstrated that the infestation of a town could be reduced from about 60 per cent to below 4 per cent with a single treatment applied to 98 per cent of the population. The results were striking, and there is no doubt that they would have been sufficient for the control of an epidemic of typhus fever. Nevertheless, these results were not lasting, and a few months later the infestation had reached almost its original level.

The study here reported is being carried on in the same region of the central plateau of Mexico in which Davis worked and, except in two villages which will be mentioned below, it has been independent of the presence of typhus fever. Successive villages are selected with the purpose of rendering them free of body lice and maintaining them in that condition by the use of

* The studies on which this paper is based were conducted by the Bureau of State Health Services and the Bureau of Epidemiology of the Ministry of Health and Welfare of the Government of Mexico, with the support and under the auspices of the International Health Division of The Rockefeller Foundation. The work was undertaken at the request of the Bureau of Entomology and Plant Quarantine of the United States Government. This Bureau obtained the release of materials for the work, and through the personnel of its insecticide laboratory in Orlando, Fla., it gave valuable counsel on the conduct of the studies.

DDT powder in 5 per cent concentration. A map of each village is made to guide the work, and a careful census is taken of every family. A team of field workers consisting of a nurse and a sanitarian examines the residents of each house for lice, both on the clothing and on the scalp. The DDT powder is applied thoroughly to the clothing in contact with the skin. Single applications have been tried as well as series of two and of three applications at intervals of a week or more. The treatment of the clothes is accompanied by a treatment of the scalp with a lotion of which the basic ingredient is phenyl cellosolve.[1] This brings about temporary elimination of head lice and is repeated at each visit when reinfestation is found. In order to reach every resident of the village, Sundays and evenings are included in working time. The period of treatment is followed by several months of observation, during which examinations are repeated at intervals to measure the rate of return of infestation.

After the work had been in progress for some time in villages where typhus fever was not present, it was decided that delousing should be undertaken in San Francisco Tlalnepantla, a village where there was an epidemic of the disease, which was endangering the important town of Xochimilco. Delousing was later carried out in the presence of a similar epidemic in the village of San Lorenzo Oyamel in the State of Mexico. From the standpoint of this study these villages are essentially similar. Both are at an altitude of between 7,500 feet and 8,000 feet above sea level and have a temperate climate, with cold nights throughout the year. Agriculture, especially the growing of maize, is the chief occupation. The population is predominantly Indian, although the people of the two villages are of different types. The homes are generally poor, and in many the entire family is housed in a single room. Living conditions and inadequate facilities for washing favor the maintenance of parasitization.

In both villages the epidemiological investigations were conducted by one of the authors, an epidemiologist in the Ministry of Health and Welfare, by house-to-house visits which were repeated as often as necessary. At the same time delousing groups were visiting the homes and were of service in discovering cases of typhus which might otherwise have remained hidden. The diagnosis was based both on the clinical picture and on the results of the Weil-Felix reaction, which was determined for a sufficient number of persons in each village to establish the nature of the epidemic.

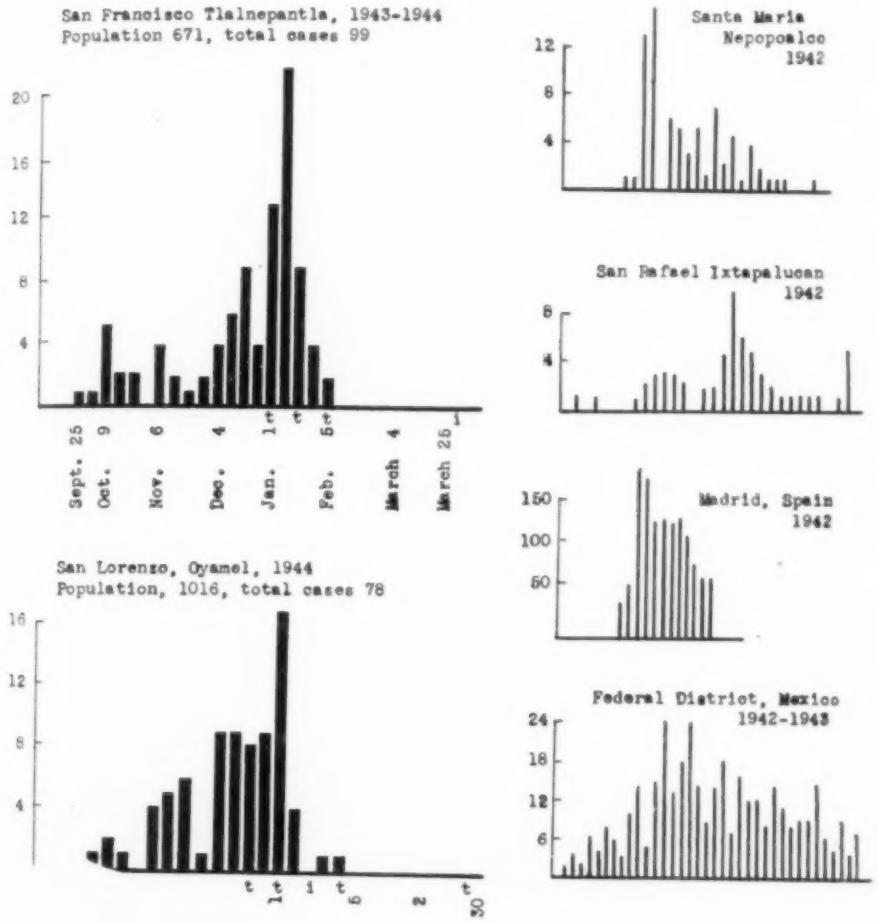
In the village of San Francisco Tlalnepantla, with a population of 671, the epidemic began in September, 1943, and reached a peak in the week ending January 8, 1944, when 22 cases appeared. The first application of powder for delousing began on January 4 and ended on January 10, during which time 430 persons were attended. In the three weeks following the application of powder new cases of typhus appeared as follows: first week 11, second week 4, third week 2, and with these the epidemic ended. The application of powder in house-to-house visits was repeated twice subsequently, ending in the second week of February. Careful search on these visits disclosed no new cases. While the delousing of this community was sufficient for stopping the transmission of typhus fever, it was not adequate for the permanent reduction of the infestation. In spite of the efforts of the staff, only 612 of the population of 671 were examined and treated.

The village of San Lorenzo Oyamel had a population of 1,016, living in scattered houses and working at agriculture and pottery. Difficulties of

FIGURE 1

Distribution of Cases of Typhus Fever by Weeks in Six Epidemics

Treatment with DDT 5 per cent was used in San Francisco Tlalnepantla and in San Lorenzo Oyamel at the points indicated by "t." Inspections for cases and parasites were made at the points indicated by "i." DDT was not used in the other epidemics and they are shown for comparison of the types of distribution of cases with and without general delousing.



laundry are evidenced by the fact that there were only two inadequate shallow wells to serve the entire population. When the study began, on June 20, the epidemic of typhus fever was active and was apparently increasing. The information collected indicated that the epidemic had begun during the week ending April 8 and that there had been an irregular increase in the number of cases until June, when the new cases in successive weeks had been 9, 9, 8, and 9. The largest number of new cases appeared in the week ending July 1, when 17 were recorded. The application of powder began on June 20 and ended on June 25 with the treatment of 739 of the 1,016 persons listed in the census. The week ending July 8 terminated 18 days after the treat-

ment began and 13 days after it was completed. During that week 4 cases appeared, as compared with 17 in the week before. House-to-house searches with new treatments were repeated during periods beginning on June 30, August 1, and September 24, and an additional search was made of all known family contacts on July 17. These searches disclosed that single new cases appeared in the weeks ending on July 22 and 29.

The evidence obtained in those epidemics indicates that application of DDT in 5 per cent concentration provides a method of delousing for typhus control which can be applied with little equipment and with personnel which is available in local health services. It is simpler and cheaper than most methods of delousing which have previously been in use. Further experience which is not reported here indicates that the control of an epidemic might be brought about by thorough delousing of contacts alone.

The primary objective of these studies, elimination of lice from a village and maintenance of the louse-free condition, presents more difficulties than temporary delousing to stop the spread of typhus infection. Infestation with lice is common in all of the villages and the attainment of the objective means that every person must wear treated clothing for a period which has not yet been determined. The first difficulty is that of achieving universal treatment in a community. At best about 98 per cent of the population can be seen in a series of three treatment periods, in each of which every house is visited several times. The persons not found are those who are at home at irregular intervals, and for that reason are important potential sources of reinfestation for other members of the families. Other difficulties are the local holidays, when the village is filled with visitors for days at a time, and holidays in untreated villages when the treated persons spend equally long times in these communities.

Through an extension and an intensification of the methods already described an attempt was made to reach the primary objective. That is, our purpose was to apply 5 per cent DDT powder to all of the clothes of every villager by a series of two or three visits at intervals of a week or more. By successive visits for subsequent inspection it was hoped that the duration of the expected period of freedom from lice could be measured and also that the rate of return of infestation could be determined. The results of these efforts to the end of September, 1944, are summarized below.

La Concepción Coatepac: original infestation, clothes 64 per cent, scalp 75 per cent; clothing treated with MYL and the infestation reduced to 3.2 per cent on March 1, 1943. By July 13, infestation in clothes had risen to 52 per cent. One application of powder 153 and one of DDT 5 per cent reduced the infestation to 6.5 per cent on August 11, but it rose again to 24 per cent on October 13, with 48 per cent of scalps also infested.

San Juan de la Isla: original infestation, clothes 33 per cent, scalps 52 per cent; clothing treated with DDT 5 per cent on June 8 and June 21; without more additional treatment than was absolutely necessary to maintain cooperation, infestation was observed as follows: July 5, 1.6 per cent; August 4, 1.1 per cent; September 6, 2.3 per cent; October 5, 9.5 per cent.

San Andrés Ocotlán: original infestation of 60 per cent in clothes and in scalps; one treatment of clothing with DDT 5 per cent was given on July 27, and on August 9 the infestation was 11 per cent. Because of lack of materials no more treatments were administered, and the level of infestation on October 11 had risen to 26 per cent.

San Lorenzo Oyamel: initial infestation, 89 per cent in clothing and 86 per cent in scalps; treatment of clothing with DDT 5 per cent on June 20, June 30, and August 1. The infestation on August 1 was 4.4 per cent in clothes and 4.8 per cent in scalps. An additional treatment was given at that time, and on September 24 the infestation was 11 per cent in clothes.

As previously indicated, the effect of the phenyl cellosolve lotion was not lasting. Examinations made within a week after treatment usually showed good results, but follow-up examinations revealed rapid reinfestation. The best results were in San Lorenzo Oyamel where, in the examinations of August 1, those persons who had been treated during the visits of June 20 and June 30 showed scalp infestation of only 1.7 per cent. During the visit of September 24 the same persons showed an infestation of 21 per cent.

SUMMARY

1. A progress report is presented on studies in delousing the inhabitants of Mexican villages through application to the clothing of powder containing DDT in 5 per cent concentration and application to the scalp of a lotion of which the basic ingredient is phenyl cellosolve.

2. With two exceptions, typhus fever was not present in the communities in which delousing studies were made. In two villages where studies were carried out while epidemics of typhus were occurring, the epidemics subsided rapidly after the application of the DDT powder.

3. The elimination of lice from a village and the maintenance of the louse-free condition has been found to present more difficulties than temporary delousing to stop the spread of typhus infection. The chief difficulty encountered is that of achieving universal treatment in a community.

4. The effect of the phenyl cellosolve lotion on head lice has been found to be only temporary.

REFERENCE

1. Davis, W. A., Malo-Juvera, Felipe, and Hernandez-Lira, Pilar. Studies on Louse Control in a Civilian Population. *Am. J. Hyg.*, 39:177-188 (Mar.), 1944.

Gamma Globulin for Measles

In connection with the editorial under the above heading in the July issue of the *American Journal of Public Health* (page 732), Dr. John B. Alsever, the Director of the Civilian Blood Donor Service of the American National Red Cross, Washington, D. C., makes the following supplementary statement.

"The gamma globulin now available for civilian use is derived as a by-product in the preparation of serum albumin for the U. S. Navy. In 1944 supplies of crude gamma globulin were accumulated in excess of the needs of the Army and Navy, and the surplus was assigned by the Navy to the American Red Cross for distribution. The costs of processing the crude material and of distributing the finished product are met by the American Red Cross, and the gamma globulin is supplied without charge to state and territorial health officers at their request."

Streamlining Hospital Techniques*

MANY will complain that streamlining is an overworked word, that dressing up the outside may not improve the content. Yet streamlining does have one connotation we can all support in wartime or, for that matter, in peacetime—stripping nonessentials and bringing essentials into bold relief. All public health workers have been concerned over the potential and actual dangers involved in staff shortages. In maternity wards and new-born nurseries these shortages may be serious. It is hoped that in presenting a symposium on this subject, the participants will give the readers of the *Journal* from their experience, not a magic formula, but the approaches which seem to bear the greatest promise of success in achieving the desideratum of safe and adequate care for mothers and babies.

By and large, present-day hospital techniques have been developed from experience—certainly a desirable method. This gradual development carries with it, however, the danger that procedures which have been outmoded may not be discarded when they have outlived their usefulness. Periodic review and evaluation is certainly essential, and it is most important to approach such a review with an open mind and a true skepticism.

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* Based on papers presented at a Joint Session of the Maternal and Child, and the Public Health Nursing Sections of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

Meeting Maternity Nursing Needs in Wartime

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THERE are a number of approaches to the problem of meeting the need for nurses during the present national emergency. In the Margaret Hague Maternity Hospital we have used most of these. I would like to discuss how we have adopted administrative and educational procedures which have materially aided us in the maintenance of the standards and policies of the institution; namely, safe and adequate nursing care for mothers and babies. This hospital in addition to being the largest maternity hospital in the United States is essentially a teaching institution. An active teaching and supervisory program had to be maintained at all times. In order to accomplish this in the face of impending shortages of personnel, a committee was formed to make a survey of all departments in the institution. Nursing procedures and functions were reevaluated and nonessentials eliminated from nursing procedures. All nonnursing functions have been delegated

to workers who have been educated and trained for the specific duties they are to carry out.

USE OF AIDES

Planned programs of classroom instruction and close supervision of the worker in the field of operations have been of considerable help. Early in 1942, at the suggestion of our local Red Cross Chapter, we gave a series of courses to our employees in home nursing. About 200 employees completed the course. These classes were taught by members of our nursing faculty who held Red Cross teaching certificates.

This provided a group of individuals within the institution, trained to carry out non-nursing duties. From this group we selected twenty who were interested and who showed an aptitude for nursing. A thorough orientation in the department in which they were to function was given to each worker by a member of the education department. A supervisor under whom they were to function was then responsible for their activities.

These non-professional workers carry the title of "Aide to the Nurse" (not Nurse's Aide). The original group of twenty aides has grown to sixty. They are working in all departments of the hospital, with the exception of the labor and delivery suite, and the premature nursery.

Briefly, the duties of the aides in specific departments are as follows:

DUTIES OF AIDES TO NURSES IN POSTPARTUM FLOORS

After the nurse has given essential care to the patients, the aide

Removes soiled equipment
Measures urine and records amount in book
Cleans and sterilizes bedpans
Is responsible for completion of bedside unit
Makes tops of beds after nurse has bathed patients and made lower parts of beds
Makes beds of all discharged patients, also ambulatory patients
Cleans perineal carts after routine perineal cares have been given
Cleans and sterilizes perineal cart equipment
Sets up perineal carts for use
Cleans and reëquips breast carts
Exchanges supplies at central supply room

With the elimination of these non-nursing functions, the nurse devotes her full time on duty to the performance of such purely nursing activities as giving baths, taking temperatures, giving treatments, and charting.

FUNCTION OF AIDES IN THE NURSERIES

Diaper babies
Collect, check, and heat formulae
Feed babies after first 24 hours after delivery
Crib making
Help push cribs into patients' rooms at nursing time
Prepare position of patients for nursing babies
Exchange nursery supplies at central supply room

This gives the nursery nurse an opportunity to concentrate her activities on:

General well baby care
Special attention to ill babies
Breast care and education of mothers in techniques of nursing babies
Breast pumping

We are also using the Red Cross volunteer nurse aides in a limited capacity in our nurseries and on the post-partum floors. During the current year, the Red Cross Chapter requested that we use our institution as a training center for the advanced volunteer nurse aides who were interested in volunteering their services as aides in the maternity departments of the hospitals of the community. A course outline for "Red Cross Volunteer Nurse Aides Experience in Obstetrical Nursing" was submitted and accepted by the Eastern Area of the Red Cross.

Only those aides who had given 150 hours of satisfactory nursing service were permitted to enroll for the course,

which consisted of 8 hours of classroom instruction and a planned program of supervision. The classroom lectures were given by a member of our education department. Prior to this assignment for service, each aide received 15 hours of individual supervision in post-partum and nursery activities by a member of our nursing staff.

The activities permitted these Red Cross volunteer nurse aides are much broader than those of the regular aides. They are permitted to give baths to patients on their 4th day post-partum, make beds, and take the temperatures of mothers and babies. The charting is done by the nurse.

Formula preparation for more than 200 babies daily is done centrally as is the care of breast milk collected throughout the hospital. This central department carries out these functions with a staff of two nurses, one of whom is the supervisor, three aides, and two maids. The formulae are prepared by the nurses. The aides pour the prepared formulae under aseptic technique. Each aide wears a madonna cap and mask, scrubs her hands, dons gown and gloves; she labels, fills the bottles and seals them under the supervision of a graduate nurse who checks and double-checks the individual formula order cards against the bottles being filled. Other duties of the aide are chiefly the preparation of equipment for sterilization. The care of rubber nipples, breast shields, cleaning and replacement of equipment for breast pumps is strictly the responsibility of the nurse.

We formerly operated our formula room from 7:00 a.m. to 11:00 p.m. Now, with concentration of activities, we operate from 7:00 a.m. to 4:30 p.m. Extra bottles of our standard formulae are kept on hand, so that if an emergency should arise, needed formulae may be obtained at any time during the night.

The central supply room is another department which functions with aides, under the direct supervision of graduate nurses. Supplies for the entire hospital, with the exception of the formula room, and our septic division where they have individual sterilizing units, are prepared and sterilized by ten aides. Two large sterilizers are operated. Assistance in operation is given by a porter when loading and unloading occurs. The central supply room is in operation 24 hours a day. The duty hours of the aides are arranged to give concentration of workers during the period of the day when the preparation and issuance of supplies is heaviest.

CHANGES IN NURSING TECHNIQUES

The greatest change in nursing techniques was made on the labor and delivery suite. In this department, we experienced a shortage of doctors as well as nurses. To facilitate activities, we substituted the sterile delivery bundle for the drum technique. This resulted in a saving of about 20 minutes for each delivery set-up, and also saved on linen which, if not used, could be resterilized.

The delivery bundle contains all the linen and equipment needed for a delivery, viz., draping material, extra towels, prep tray with specimen bottle and catheter, and an instrument roll which contains 19 instruments, placed in the order in which they are to be used during the delivery. The instruments are held in place by a one inch twill tape stitched to the required spacing.

Once the drapings and baby linen are placed, the table can be set up in three steps. The prep tray on the upper right of table, extra towels on left side, and instrument roll opened. Initial prep tray, large basins, placenta basin and obstetrical forceps are separately wrapped. Eight delivery rooms are kept set up with this technique at all times.

Aides are not used in this depart-

ment but we have always used maids for cleaning delivery rooms, removing soiled linen and checking instruments. They also help in handling patients ready for delivery.

OTHER TRAINING ACTIVITIES

Because of our heavy teaching program, including both affiliate and postgraduate students, it is necessary to maintain a large staff of graduate nurses and ward instructors. These instructors have completed our postgraduate and supervisory courses in obstetric nursing. This supervisory course gives the students who have completed the 4 months' postgraduate course an extra 2 months of instruction and experience in supervision, also practice in conducting a ward teaching program. For experience in the field of supervision, these graduate students are rotated in the services and act as student assistants to the supervisors. Those who show an aptitude for teaching are given positions as ward instructors in the various services of the hospital where students are assigned.

With the constant rotation of students, the supervisors of all departments carry a heavy burden of responsibility. They are responsible for the smooth functioning of the departments, the activities of the nurses and aides, as well as organizing and carrying out an active ward teaching program.

The program in operation throughout the hospital is flexible and adjustments are made when the need arises. With the increased numbers of students enrolled in the U. S. Cadet Nurse Corps, our affiliate students have increased in proportionate numbers. This has placed a tremendous burden upon the education department.

SUMMARY

In summary, we are meeting the present emergency situation in three general ways.

1. By training and using a large number of nursing aides.
2. By analysis and reorganization of departmental activities.
3. By training affiliate and postgraduate nurses for the positions opened by the expanding demands for hospital care.

Nursing Techniques in Maternity Hospitals

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THE tremendous increase in births in recent years combined with the decrease in hospital personnel has presented a major problem in furnishing adequate hospital care. This discussion will be limited to the nursing phases of the problem although success of any program has to be based on wholehearted coöperation by all persons and services.

The four major areas of nursing service in a maternity hospital are: (1) labor and delivery service, (2) care of postpartum mothers, (3) care of newborn infants, (4) preparation of formulae. To these can be added instruction of the mother in care of herself and her baby and education of the public as to the need for community coöperation in the maternity problem.

In Connecticut each of the hospitals caring for maternity patients served

as a source of information in studying and solving these problems. In some of the larger cities where two or more maternity hospitals exist, joint plans were made resulting in better service to mothers and babies and increased cooperation on the part of the public.

After thorough study a number of concrete suggestions as to how these problems could be met were adopted. Some of these will be discussed in the following paragraphs.

LABOR AND DELIVERY STAFF

Since constant supervision of patients during labor and delivery is essential, these services should be fully staffed both day and night.

POSTPARTUM CARE OF THE MOTHER

This can be greatly simplified without jeopardy to the mother's safety. After the first 24 hours, most mothers feel very well, they move about freely in bed, and, except for the aseptic care of the perineum and of the breasts, can readily bathe themselves. A simple method of perineal care carefully carried out once a day and following defecation with application of dry sterile pads at other times has proved safer than more frequent care which tends to become careless due to pressure of work. Individually wrapped packages containing a pad and 5 to 6 cotton balls and individual forceps sterilized after each use provide a simple safe technique. Bedpans should be sterilized after each use or kept at the bedside and sterilized after discharge of the patient. Newspaper bedpan-covers discarded after one use, will prevent contamination of bedpans by cloth covers used several times. Convenient hand washing facilities and insistence upon their use before and after handling every patient will do much to lessen the danger of cross-contamination of patients.

Breast care is another technique that can well stand careful scrutiny. The procedure of swabbing before and after each nursing with boric acid solution has proved in many instances an ineffective ritual which in itself may be a source of contamination. Many hospitals have found that careful bathing of the breasts once daily followed by covering them with a clean towel has proved quite satisfactory. Discontinuing the use of breast and abdominal binders except for specific reason is another means of saving nursing time.

CARE OF BABIES

Two principles involved in nursing care in nurseries for new-born infants are:

1. Prevention of introduction of infection from outside
2. Prevention of infection between infants

1. The number of persons entering the nursery should be strictly limited to the number necessary to give care. Nurses assigned to the nursery should not care for any other patients where infection may be present. Private duty nurses should not be permitted in the nursery. Any person entering the nursery should wear a gown and an effective mask over the nose and mouth. Doctors and nurses should wash their hands thoroughly before entering the nursery and before and after handling each baby.

2. The care of babies should be completely individualized. Infants should not be bathed or changed on a common table, and anything coming in contact with the baby should be scrupulously clean and, if possible, sterilized.

Care of the skin—A modified Sanford method is recommended because from all available evidence it is fully as effective as any other method of care and it takes the least amount of nursing time. Immediately after birth, the blood is wiped off and excess vernix is carefully removed from the folds of the skin, especially from armpits and the

groins; thereafter, the clothes are changed daily but the baby is not bathed or oiled until discharged.

Dressing and diapering — Dressing and diapering should be done in the baby's own bassinet or on adjoining tray or individual table (not on a common table).

Weighing—Weighing and the recording of weight is very time consuming. Reduction of the frequency of weighing would save nursing time proportionately as well as reducing the possibility of infection by daily use of the common scale.

FORMULA PREPARATION

Principle—Because the formula or milk mixture is an important possible source of infection for new-born infants, formulae should be prepared and kept under strict, aseptic conditions and handled as little as possible.

Attendant—Formulae should be made by the nursery nurse or by a dietitian. An effective mask over the nose and mouth should be worn while formulae are being prepared.

Procedure—All equipment and material used in the preparation of formulae should be sterile. It is recommended that formulae or milk mixtures be put up in individual bottles, nipple, and nipple protector applied, and the whole sterilized. Formulae should be cooled immediately and placed in a refrigerator kept at 50° F. Nipple protectors are made of Pyrex glass or aluminum and completely cover the nipple, resting on the shoulder of the bottle. During sterilization, heat and suction causes them to cling to the base of the nipple. The nipple protector should not be removed until immediately before the nipple is to be put in the baby's mouth. This procedure sometimes breaks down in the nursery at feeding time, when often many nipples must be changed because they are too soft or too hard for individual babies. If a nursery nurse, who is acquainted with each baby, prepares the formulae, she can choose, and place the right type of nipple for the bottle of each baby when preparing formulae and so prevent possible contamination of changing nipples.

Breast feeding—Perhaps I should refrain from any discussion of this subject, since in spite of the continued assertions of physicians and nurses as to its value, the percentage of breast-fed infants is so small as to be almost nil. Even the fact that the psychiatrists have joined the ranks of breast-feeding advocates by stressing its emotional advantages has had little effect. If the baby must be bottle-fed we feel this should be done by the mother who thus learns the technique of feeding and bubbling and becomes better acquainted with her baby. The custom of propping bottles in the nursery is dangerous since the infant may aspirate the milk. Moreover, it fosters a poor habit of associating the bottle with sleep instead of with eating.

Many other hours of nursing time have been saved through coöperation of physicians, hospital administrators, public health nursing, and other agencies. The changes in procedure which I have discussed have all been brought about with the approval of physicians responsible for obstetrical services in hospitals. In addition, many hospitals have shortened the hospital stay of maternity patients to handle the increased load; such routine procedures as four hourly temperatures, routine measuring of intake and output have been omitted; a limited number of stock formulae have replaced the many formerly ordered; babies have been weighed only two or three times a week, and many other time-consuming procedures have been omitted. Through coöperation with Jewish organizations the number of guests at ritual circumcisions has been reduced. Much time

can be saved through restricting visitors, limiting viewing of babies, and setting rules for receiving and care of flowers. Such restrictions may arouse antagonism unless the reasons are made clear.

One of the important functions of personnel working on a state level is the observation of techniques in various hospitals, the evaluation of these techniques, and transmission of the desirable features to other hospitals. The support of the state agency in the form of uniform regulations may be invaluable.

CONCLUSION

Streamlining nursing techniques in maternity services has been successfully carried out in Connecticut with the resultant saving of many hours of nursing time while continuing to give safe care to a greatly increased number of mothers and babies.

Through coöperation of hospital administrators, physicians, nurses, public health agencies, and other organizations, many changes have taken place in procedures long considered essential but which upon careful analysis proved to be alterable.

When conditions due to the war are over, nurses look forward to including again many of the niceties of care which of necessity have been curtailed. We are convinced however that this experience has drawn us back to fundamental principles of care from which we can proceed intelligently, rather than blindly following outmoded and unessential rituals.

The Point of View of the Public Health Physician

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HOSPITAL service, public health, and medical care are the three basic activities forming the structure of health service for the people. There is a growing realization that these three activities are fundamentally interrelated, and one is not complete without the others. The importance of hospital service in this relationship is particularly apparent in the field of maternal and child health in which there is a growing tendency toward having all confinements in hospitals. From this point of view, the public health physician, whose function is the protection and promotion of health for all the people, has an active interest in hospital service. He represents the public's interest, but only under the limitations of whatever authority the public has given him by legislative enactment. With respect to hospitals the public interest is most commonly expressed in the form of a governmental program of inspection, approval and licensure. How does a licensing program affect the streamlining of hospital technics?

In April, 1941, the Minnesota Legislature passed a bill requiring the annual licensure of all hospitals and related institutions which after inspection meet the approval of the State Department of Health. This law also transferred to the Minnesota Department of Health the licensing function under the state maternity hospital law, which prior to this time, and since it became effective in 1918, was administered by the State Welfare Agency. Specifically with respect to maternity care the laws provide for the establishment of special require-

ments for public and private maternity hospitals, and cover all places receiving more than one maternity patient within a period of six months.

The purpose of this legislation, it may be assumed, was to insure safe and adequate care for patients in places other than their own homes. To provide safe and adequate care a hospital must be operated efficiently. Therefore, any effective program developed to carry out the purpose of this legislation will, at the same time, promote hospital efficiency. In what ways does a licensing program do this?

First, standards are necessary as a basis for issuance of licenses. In Minnesota, the law empowers the State Health Department to establish reasonable standards which it finds necessary in the public interest. Under the provisions of the law this function is carried out with the assistance of an advisory board composed of four representatives of the Minnesota Hospital Association, two representatives of the Minnesota State Medical Association, and the State Director of Public Institutions. Standards have been established which in general cover the physical plant, accommodations for patients, equipment and facilities for care, adequacy of personnel, and reports and records. The development of sound standards and their persistent application through periodic investigation and under the compulsion of annual licensure should prove an effective measure for the development of efficient and safe hospital procedures.

Second, the Minnesota Department of Health requires the submission of plans and specifications covering any new construction for review and approval for compliance with licensing standards. This review of plans provides opportunity to promote streamlining of hospital technics.

A concrete example of the benefits to be obtained from this measure is in the review of plans for adequacy of utility rooms. The lack of adequate work and storage space and equipment and supplies will cause much unnecessary work and will limit the efficiency of the nursing service. Our experience indicates that this requirement for utility rooms has been frequently overlooked in the construction of hospitals. Also, there is probably no improvement more difficult to obtain after the hospital is operating to capacity. Therefore, the Minnesota licensing standards include the requirement that there shall be adequate space and facilities for the proper cleansing and storage of nursing supplies and equipment, that suitable provision must be made for preparation of medications and treatments, and that utility rooms should be conveniently located for efficient conduct of the work. Also, they must have outside exposure and satisfactory lighting and ventilation. These requirements are applied very carefully in the review of plans for new construction so as to prevent future failures in provision for utility rooms. In a number of instances architects and sponsoring organizations have been asked to revise plans for relocation of these rooms to outside walls, or to enlarge them to provide more counter and cupboard space.

Another example of how the review of plans promotes efficiency of nursing service is the check made for compliance with the requirements for hand-washing facilities. Emphasis is placed on an adequate number of fixtures conveniently located in work areas, and on the design of the fixture with respect to comfort and ease of hand-washing. In the review of plans it has been possible to point out how the provision of a well designed scrub-up sink, or the relocation of a lavatory, may save many steps and much time for the nurses.

Surveying hospital technics is a third activity which gives opportunity for promoting streamlining. In the survey,

the objectives have been area segregation of activities, provision of adequate equipment, and simplification of procedures to achieve a safe and adequate care. Suggestions for improvement are worked out with the hospital staff. These surveys are carried out at the request of the hospital, and are also made in conjunction with the epidemiological investigation of outbreaks of infection in the maternity department. Although they have not been made a part of the routine investigation, we believe a licensing agency should be prepared to give this service on a consultation basis.

In Minnesota it has not seemed practical to prescribe specific procedures for all hospitals. There are three reasons for this point of view: (1) the procedure must be adapted to the individual situation; (2) routine supervisory visits cannot be expected to control the daily observance of a given method; and (3) sufficient funds are not available to finance detailed investigations in all hospitals. Also, we believe that the hospital should assume responsibility for the details of the procedure. However, the licensing agency should meet its responsibility for safe and adequate care by establishing requirements for qualified personnel which will promote hospital responsibility and for adequate and convenient facilities which will enable the personnel to work efficiently.

In addition to the physical improvements indicated there are many routine hospital procedures which permit of streamlining, such as simplification of skin care, individualized crib care in the nursery, the elimination of a.c. and p.c. weighing of every new-born infant, simplification of perineal care and breast care technics, and reduction of temperature taking. Hospitals should study these and other procedures with the object of simplification, retaining all that is necessary to protect the adequacy and safety of the care.

In making this study, the hospital should follow a thoughtful and purposeful plan of procedure. Unquestionably, streamlining of technics is most easily accomplished in the hospital where there is standardization of care, rather than a variety of procedures. This requires unanimity of opinion among the physicians. Streamlining is desirable from the standpoint of the hospital administrator because it will reduce cost of nursing care, and we may assume that he will coöperate in securing any new equipment which may be needed. The experience and training of the nursing staff in the development of details are also necessary. From the foregoing it is obvious that streamlining of procedures must be a coöperative project, and it will be necessary for the hospital staff to organize for the purpose. The following course of action is suggested:

1. A committee of physicians should be appointed to determine basic needs of care.
2. The nursing staff then develops the technics for giving the care.
3. The proposed technics are then presented to the medical staff for final consideration and approval.
4. Finally, revised procedures are put into effect. This will necessitate making the written routines easily available to all personnel on the hospital floor, and delegating responsibility for supervision to a qualified nurse.

SUMMARY

The public health physician has an interest in and responsibility for the promotion of greater efficiency in hospital procedures. This interest and responsibility can be best translated into action if the public health physician is empowered to carry out regulatory measures, as in a hospital licensing program. Given this authority, the public health physician may be an effective agent in the promotion of more efficient service.

In this program, emphasis is placed on the necessity for qualified and responsible personnel, and adequate facilities for providing care, with the hospital responsible for establishing details of procedure.

Within the hospital, the promotion of greater efficiency—that is, the "streamlining of technics"—is best done if there is coöperative planning by physicians, nurses, and hospital administrator.

Practical Implications of the Epidemiology of the Diarrheal Diseases of the New-born

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THE diarrheal diseases constitute one of the major preventable causes of infant morbidity and mortality and a discussion of them illustrates how consideration of epidemiological features will serve to place first things first in nursery practice. The etiology of these disorders is only partially known at the present time, but both the outbreaks as well as the isolated cases may be divided into four groups on the basis of known and suspected etiological agents, (1) known pathogenic bacteria causing diarrheal disease, as *Shigellae* and *Salmonellae*, (2) bacteria whose etiological relation is suspected but not known as paracolon bacilli, pseudomonas, etc., (3) virus infections, and (4) parenteral infections.

An outstanding feature of reports on nursery diarrhea is the infrequency with which recognized pathogens have been isolated. This is probably due to two factors, first that infections with *Shigellae* and *Salmonellae* are much less common in infants than in older children and adults, due in part to limited opportunities for exposure, and second to the much greater difficulty of obtaining satisfactory cultures in very young children. Even with the selective media now commonly used, isolated colonies, essential for proper study, are very difficult to obtain. A much smaller inoculum must be used and consequently there is a greater chance of missing the important organisms which may be present. That infection with members of these groups do occur with somewhat more frequency than is generally believed is shown by the fact that we have seen three primary infections with recognized pathogens in one premature nursery in the past year, two with *Shigellae* and one with a *Salmonella*.

A second point with regard to the diarrheal disorders of babies is the frequency with which some of the usually non-pathogenic organisms are encountered in abnormally large numbers in the stools of sick children. Paracolon bacilli, pseudomonas and others are quite frequently the predominating fecal flora. Evidence at this time is no more than suggestive as to the etiological relationship that these organisms may have, though most of them at one time or another have been given credit for an outbreak of nursery diarrhea by competent workers.

Chiefly because of uncertain bacteriological results, a virus has long been suspected as the cause of many of these disorders. Definitive results along these lines have not as yet been obtained, and conclusions must await further investi-

gations, but at least one group of workers [1] have isolated a filterable agent which appears to bear an etiological relationship to the diarrhea of the new-born.

Systemic and localized infections are also responsible for the symptom diarrhea in infants and older children. Since these are not primarily enteric in origin or spread, they will not be considered in this discussion but they, of course, must be a part of the differential diagnosis when individual cases or outbreaks are studied.

The recognized pathogens which cause diarrheal disorders are for the most part located in the intestines, escape to the outside only in feces, and are spread chiefly by person-to-person contact (in the case of infants a third party assists) of a sort which permits transfer of human excreta. Clinically and epidemiologically the diarrheal disorders from which such pathogens are not recovered are usually indistinguishable from the above. It is likely therefore that irrespective of the nature of the etiological agent, all are spread in the same manner.

Assuming that these are enteric infections, the problems of the diarrheal diseases of the new-born are: How do infectious agents get into the nursery, and how can their spread be prevented?

Usually the doctor, nurses, attendants, mothers, and visitors are suspected whenever an isolated infection appears in a nursery. They are the babies' only contacts with the outside world, and healthy carriers of enteric pathogens are common. These sources are easily minimized or eliminated by restricting the numbers of these contacts to the essential ones only, and insisting upon proper protective measures in the case of the essential few. These procedures are usually well carried out by most modern nurseries.

Very little attention, however, is paid to the babies themselves as potential vectors. Of course, when a child is born unattended or in the home, it is usually not admitted to the general nursery. On the other hand, a child born in the delivery room after the usual pre-delivery preparations of the mother is customarilly considered "clean" and admitted without restrictions.

That such an assumption is a dangerous one is shown by the following examples as seen in a premature nursery during the past year. A baby developed a bloody diarrhea on the third day after birth, and cultures of the stool revealed *Shigella sonnei* infection. The mother was investigated and was found to have the same infection with a history of mild diarrhea for three days before delivery. Post-mortem cultures on another child revealed *Salmonella typhimurium* infection, and similarly the mother was ill with an acute diarrheal disorder due to the same organism. This latter child was particularly dangerous in that it showed no signs of enteric disease until just before death on the fourth day of life.

Both of these cases were delivered after complete preparation and the babies were immediately isolated from the mothers. Infection must have taken place at the time of delivery in spite of the normal precautions.

Another *Shigella* infection was seen in the same nursery. The child began to have diarrhea 48 hours after delivery, and cultures were positive. The mother in this case was not seen until two weeks later as she had gone home by the time the diagnosis was made. She denied any diarrheal disorder and a single stool culture at that time was negative. The similarity of this case to the other one known to have acquired its infection at birth indicates that this too was probably acquired in the same manner.

These were recognized pathogens. If other organisms, usually non-pathogenic for adults, are dangerous for children,

it is certain that many children thus act as vectors of infection. The best of nursery care cannot prevent the introduction of infection in this manner. That is a matter for the obstetrical service. Nursery technique, however, must be such that these infections, when introduced, remain an individual rather than a group problem.

Stringent regulations have been devised for the operation of new-born and premature nurseries. The technique developed by the Dicks in Chicago, that of Hess and Lundeen, the regulations of the New York City Board of Health, and those of the Children's Bureau of the U. S. Department of Labor, to mention only a few, have all been published. These rules are all directed toward the ideal, namely maintenance in the nursery of a program of asepsis as good or better than that employed in the well conducted operating room. With this ideal, there can be no quarrel. At the same time it cannot be attained unless the nursery has been designed with this in mind (not just another room on the obstetrical or pediatric floor) and the staff is sufficiently trained and numerous to permit the carrying out of these procedures. Very few hospitals are so designed and staffed at this time. The program must therefore be a limited rather than an ideal one and directed toward obtaining maximum effect from each method used.

This means that each individual nursery must survey its assets as well as its defects and set up a procedure which is applicable to that particular situation. General rules can be no more than guides which assist in full utilization of those assets. There are, however, certain basic standards which cannot be undercut.

First of these is assuring the sterility of all mass modes of spread such as food, water, clothing, etc. This can be accomplished even with limited facilities if a single individual is given complete charge of the preparation and delivery to the nursery of these supplies. This is particularly true of the preparation of food, water, and nipples. Such a person must have a well founded knowledge of aseptic technique and should be shown clearly and conclusively the reasons for each step in the adopted program. A few simple cultural procedures which can be done in any laboratory make impressive demonstrations of how improper handling at any point can result in massive contamination. When responsibility and accountability are vested in one person, situations similar to one recently observed by us will be avoided.

Cases of moderately severe diarrhea began to appear in a nursery which for some time had been free of these disorders. *Pseudomonas aeruginosa* (*B. pyocyaneus*) were found in large numbers in the stools of the sick infants, an organism rarely found in normal infants of this age group. The rapidity of spread and wide distribution of the cases indicated a common source of infection, so investigation of the food supply was undertaken at once. This revealed that in order to conserve materials the practice of autoclave sterilization of nipples in individual cellophane packets had been replaced by mass boiling and storage until needed, in supposedly sterile cans. The nipples, in a gauze bag were transferred immediately from boiling water to the containers, in the bottom of which was a gauze pad. This pad was dirty looking and culture showed a very heavy growth of pyocyaneus as well as colon bacilli. Immediate isolation of all cases and resumption of the individual sterilization procedure was ordered and no further cases developed.

While not proving an etiological relationship between the organism isolated and the cases, this did demonstrate gross contamination of the nipples

being used and was illustrative of what may occur in the absence of individual accountability. It was no one person's job to see to it that the cans were kept properly sterile. The nipples were boiled a sufficient time and were completely covered with water, but there was ample opportunity for introduction and maintenance of contamination in the cans since their care was a case of everybody's job being nobody's job. This was a streamlining procedure which did not work, not because it was inherently bad, but because proper safeguards were not used. Properly supervised, this method of nipple preparation could be entirely safe. It would always have the definite weakness, though, of possible mass contamination by relatively insignificant breaks in technique and therefore would not be recommended except under conditions of absolute necessity.

The second basic procedure is to keep the number of persons entering the nursery or having any direct or indirect contact with the children at an absolute minimum. This would include restriction of visitors to the obstetrical floor and absolute exclusion during the hours when the children are at the breast. In premature nurseries this is not usually a problem since these babies are best kept in strict isolation even from the mother, not simply to prevent infection but to minimize handling and permit other special procedures so frequently needed. Those who enter the nursery for any reason should be permitted to do so only after thoroughly cleaning the hands and putting on gowns or other special clothing. Enforcement of this rule should be the responsibility of the entire staff of the nursery unit, with the nursing supervisor having final authority. Internes, residents, and visiting staff members are usually the worst offenders in this particular regard, and in order to prevent unpleasant incidents, they should be so informed in writing by the hospital director.

As we have seen, however, the staff and other postnatal contacts are not the only sources of infection in newborn nurseries. In fact, if protective devices are only moderately effective, they are probably infrequent sources of the original infection. The less emphasized and therefore more dangerous source is the child infected at birth. The previously mentioned case of *Salmonella typhimurium* infection is illustrative. The initial case died four days after birth and was not suspected of having an enteric infection at that time. It was only after finding that the cases of diarrhea which occurred in adjacent cribs were *Salmonella* infections and that the dead child's mother had an identical infection, that the true nature of the illness was suspected. Post-mortem cultures taken three weeks after death proved the nature of the first child's illness as well as the cause of death. This outbreak, together with the finding of single cases of *Shigella* infection under similar circumstances, indicates that each new admission should be considered a source of infection as well as a potential infectee.

Further investigation of the above outbreak was also instructive in that it indicated that the secondary cases resulted from a relatively direct transfer of the infection from one child to the others by the attendants in the course of their regular nursery duties. It is an excellent example of the point where breaks in technique are most likely to occur unless the personnel has been trained to think of all objects, animate and inanimate, as contaminant unless definitely known to be otherwise. It is not uncommon in nursery practice to see individuals who religiously wash their hands after diapering a baby or before feeding the child, go from one crib to the other, adjusting a blanket here, turning a child over there or just

patting another. When questioned, they are frequently entirely unaware of any break in technique. While such breaks may not be efficient spreaders of infection, they undoubtedly can and do prove effective at times. The rule for workers in the nursery must be to wash their hands with soap and water after any potentially unclean object has been handled. This will not prevent the introduction of infections acquired at birth, but it will effectively reduce the chances of such infection being spread to any other children.

In conclusion, the points which, from the epidemiological point of view, should receive major, unrelenting attention are:

1. Insure sterility of all supplies, particularly those which are potential means of mass spread of infection.
2. Limit outside contacts in so far as possible, and see to it that necessary contacts are safe ones.
3. Adopt a technique in the nursery which emphasizes the danger of all children as potential sources of infection, no matter what may be their state of health. This latter rule, while quite likely the most important in most nurseries, is certainly the most neglected.

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Venereal Disease Epidemiology in Wartime*

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THE basic principles of venereal disease epidemiology are essentially the same in wartime as they are in peacetime—infected persons must be found and treated, and additional persons to whom or for whom discovered infections have spread must be identified, traced, and treated.

Placing large numbers of people in uniform and under the jurisdiction of military and naval authority no more changes these fundamental principles of venereal disease epidemiology than it changes the fundamental principles of nutrition or sanitation. It does, however, create the urgent need for intensified application of these principles. It also affects the responsibility for, and the routine procedures related to, a large part of the venereal disease epidemiology job, as well as other aspects of venereal disease control.

Venereal disease control in wartime becomes the joint responsibility of the military and civilian health authorities. Because venereal disease among military personnel is acquired from and transmitted to the civilian population, the success of both the military and the civilian programs obviously requires coördination of efforts.

In 1940 when it became apparent that the United States might be drawn into World War II, military and civilian health authorities were faced with the historical threat of a wartime increase of venereal disease. The U. S. Army, the U. S. Navy, and the U. S. Public Health Service promptly formulated a joint wartime program for the control of venereal diseases in areas where armed forces were concentrated; this program, which became known as the "eight point agreement," was adopted by the Conference of State and Territorial Health Officers in May, 1940. Prevention, early diagnosis, and early treatment of venereal disease by both the military and civilian health authorities, and the reporting of contacts by the military to civilian health authorities, were emphasized.

Routine blood testing had long been employed as one of the principal methods of syphilis case finding, and the Selective Service System, with the coöperation of the U. S. Public Health Service, and state health officers, decided to perform blood tests for syphilis as part of the general physical examination for selectees. By means of these tests, evidence of syphilis was discovered in more than 700,000 men. Prompt follow-up by civilian health authorities succeeded in placing under, or returning to, treatment the vast majority of these cases. On the basis of results of blood testing of the first two million selectees, it was estimated that the prevalence of syphilis in the United States was approximately three million.[1] Selective Service blood test-

* Based on a paper presented before the Epidemiology Section of the American Public Health Association at the Seventy-third Annual Meeting in New York, N. Y., October 4, 1944.

ing was a historic first large scale attempt to reduce this reservoir of syphilis infection.

But reduction of the reservoir by blood testing and treating males, while in itself an extremely important step in venereal disease control, could not be expected to eliminate the spread of infection. The medical programs of the Army, Navy, and Coast Guard were designed to find early infections in their personnel and treat them until non-infectious; educational programs which emphasized prevention were conducted on a large scale. As was recognized in the "eight point agreement," venereal disease control programs in the armed forces, no matter how efficiently conducted, cannot be effective as long as infections exist in large numbers among both men and women in civilian communities. The success of venereal disease control programs among military personnel is therefore dependent upon effective case finding and case holding methods among civilians; the success of the civilian program, in turn, is furthered by efficient case finding and contact reporting by the armed forces. The reporting of alleged source and spread contacts by the military to civilian health authorities is a vital link between health jurisdictions.

In the early war period no standard form for the reporting of contacts by the military to civilian health authorities existed. Many of the forms in use in camps and stations were inadequate and methods of distribution were cumbersome. Early in 1942, the Office of the Surgeon General of the Army recognized the need for a standard method of reporting contacts and for an effective method of routing this information to civilian health authorities. With the collaboration of the U. S. Public Health Service, and drawing on the experience of Army medical officers and civilian health authorities, the Medical Department of the U. S. Army substituted the Standard Form (Med. 140) for the heterogeneous collection of forms previously in use. Since that time, the U. S. Coast Guard and the U. S. Navy have adopted standard forms and standard methods of routing the information to civilian health authorities.

Civilian health authorities also mobilized to meet the threat of spreading infection to and from the civilian and military population. One problem facing these authorities was to examine, place under treatment, and hold to treatment until rendered non-infectious, girls, prostitute and otherwise, who were suspected of having a venereal disease and of infecting members of the armed forces. Follow-up workers became a necessity because of the shortage of public health nurses and medical-social workers trained in venereal disease epidemiology. Many health departments employed lay investigators recruited from a variety of fields and trained for this purpose. Health officers have been most enthusiastic about the accomplishments of these workers who have made an outstanding contribution to the venereal disease control program in wartime.

In addition to their value in providing health officers with data regarding alleged infected persons, contact reports of the armed forces serve an extremely useful purpose in providing accurate information to Army, Navy, and civilian health and law enforcement authorities regarding the places—such as taverns, rooming houses, and other sites—where prostitutes and flagrantly promiscuous amateurs were being encountered most frequently. This enables more intelligent and effective enforcement of laws and conduct of programs directed against the commercial exploitation of sex. Planned programs of prevention and redirection through recreation facilities, welfare services, and

other social approaches to venereal disease control were aided by the information provided through contact reporting.

Much credit is due the Social Protection Division of the Federal Security Agency for the general assistance it has provided health and law enforcement agencies and the armed services in this important aspect of control. Similar credit is due to the American Social Hygiene Association for its investigative, educational, and consultation efforts in both medical, and social protection activities.

In general, it may be said that in the operation of the joint military-civilian venereal disease control program, contact reporting is a major function of the military, and follow-up of these contacts is the major function of the civilian health authorities. In an effort to obtain data which could be used to evaluate the effectiveness of the joint program and as a guide to future effort, civilian health authorities were requested to report back to the armed forces on the results of investigation. U. S. Public Health Service Regional Tabulating Units are coöperating with Army Service Commands in preparing these data.

The armed forces are constantly endeavoring to improve the quality of the information submitted on contact forms. Toward this end, arbitrary categories have been set up in several Army Service Commands and the Navy Bureau of Medicine and Surgery within which contact reports can be classified. Some of these classifications are rather elaborate, such as complete name and address, complete name and incomplete address with the place of encounter specified, etc. In one method of classification which is relatively easy to use, forms are classified as providing: (1) sufficient information for possible location of the contact, (2) sufficient information to provide a possible lead for the location of the alleged contact or to point out places which appear to facilitate transmission of venereal disease, (3) insufficient information for referral for any practical purpose.

Data from Army Service Commands indicate that the Army has succeeded to a great extent in reducing the number of reports containing apparently inadequate information and in increasing the proportion of forms containing apparently adequate information. For example, in one Service Command the percentage of contact forms containing information apparently insufficient for practical use was lower in 1943 (36 per cent) than 1942 (44 per cent). Similarly the percentage of forms containing "sufficient information for possible location of the contact" increased in the same period from 29 per cent to 41 per cent. Although the percentage improvement for white soldiers (63 per cent) was greater than for colored soldiers (26 per cent), colored soldiers give better and more complete information than white soldiers, according to the arbitrary classifications and according to the results of investigation by civilian health authorities. In another Service Command, colored soldiers gave more specific information, according to the arbitrary classifications, than did whites in two states, but gave less specific information in two other states.

Some Service Commands prepare monthly tabulations showing the percentage of results of investigation returned by civilian health departments within an arbitrarily defined time period, for instance 60 days. It is not unusual for Service Command Liaison Officers to notify civilian health officers of cases on which the results of investigation have not been returned within this specified time period. The tabulations prepared for Service Commands indicate a higher percentage of cases not returned by civilian health authorities to the Service Commands within the 60 day period from date of report (42

per cent) than is indicated by tabulations prepared by civilian State and Regional Tabulating Units (5 per cent), where the time period is measured from the date of receipt of the form. Two obvious reasons present themselves: (1) a delay in getting the contact information into the hands of the local health departments responsible for investigation of the cases, and (2) failure to route the completed investigation back to the Service Command in which it originated. Fortunately in most cases contact forms are routed in an efficient manner.

Tabulations prepared for Service Commands indicate that approximately 18 per cent of the Army contacts reported are located within the arbitrary 60 day period and 27 per cent are eventually located regardless of the time period in which the case was closed. Tabulations prepared by civilian tabulating units indicate a much higher percentage of location of contacts of the armed forces (an average of 36 per cent, ranging from 22 per cent in one area to 41 per cent in another). Both sets of figures indicate that approximately half of the persons located are diagnosed as being infected (54 per cent Service Command tabulations and 51 per cent civilian tabulations). Both sets of figures indicate that approximately one-third of the persons located are brought to treatment for the first time as the result of the investigation (38 per cent Service Command tabulations and 35 per cent civilian tabulations).

Data from areas in which comparative tabulations are available indicate that contacts of the armed forces comprise approximately one-half of the nonfamilial contacts reported to civilian health authorities for investigation (average 46 per cent, ranging from 29 per cent in one area to 61 per cent in another). A higher percentage of civilian contacts (43 per cent) was located than of contacts of the armed forces (37 per cent). A slightly greater percentage (21 per cent) of civilian contacts reported was found to be infected than of contacts of the armed forces (19 per cent). However, the percentage of cases reported which were brought to treatment for the first time as a result of investigation was the same for both groups—13 per cent for contacts of the armed forces, and 13 per cent for civilian non-familial contacts.

In these same areas in the semiannual period, July–December, 1943, 1,884 new infections were brought to treatment as a result of investigations of the armed forces' contacts and 2,140 as a result of investigation of nonfamilial contacts reported by civilian health authorities. These figures indicate the important rôle played by contact reporting of the armed forces in the venereal disease epidemiologic program during the present war effort. The fact that almost half of the encounters between members of the armed forces and civilians occurred outside of the state in which the patient reported for treatment, added to the magnitude of the task. If civilian health authorities apply themselves to the task of interviewing new patients for contacts with the same enthusiasm and thoroughness with which infected members of the military personnel are interviewed, we should approach more nearly and more rapidly our goal of breaking the chain of infection.

One of the greatest problems facing the health officer has been the difficulty of holding syphilis patients to treatment until they are permanently non-infectious. Under the older routine schedule, treatment of a patient with 20 injections of an arsenical and 20 injections of heavy metal extended over a period of approximately 40 weeks. Lapsing from treatment became the rule rather than the exception. Data collected by Regional and State Tabulating Units

indicated that only one-fourth of the patients admitted with early syphilis to state clinics were held to treatment until minimum protective therapy had been received.

Early results of newer and more rapid types of therapy for syphilis indicated that patients could be rendered permanently non-infectious much more quickly than under the older routine schedule of therapy. However, the administration of most of these new treatments requires hospitalization. Through funds made available by the Lanham Act and administered by the Federal Works Agency, an opportunity was provided to acquire liquidated National Youth Administration and Civilian Conservation Corps camps and similar readily available facilities and to convert them to special hospitals for the rapid treatment of syphilis and gonorrhea. There are now in operation 11 federally-operated and 52 state-operated Rapid Treatment Centers, with a bed capacity of approximately 6,000. Numerous cases are also being hospitalized and treated in general hospitals.

Several forms of intensive treatment are being used, but the advent of penicillin opens new vistas for the venereal disease control program. At present penicillin is available for the treatment of sulfa-resistant gonorrhea and for the treatment of syphilis in the first stages. Its place in the treatment of gonorrhea is evidently established, and preliminary figures regarding its effectiveness in the treatment of syphilis offer promise that the ideal quick treatment for syphilis may at last be near.

The participation of the armed forces in the joint military-civilian venereal disease control program continues even after the separation of personnel from the armed forces. Neither the Army nor the Navy will release back to civilian life personnel with venereal disease in an infectious stage. Both the Army and the Navy are making provisions for the referral to civilian health authorities of complete information regarding the diagnosis and treatment of persons who have been treated but for whom further treatment or observation is considered necessary. Arrangements have been made by the Surgeon General of the U. S. Army and the Surgeon General of the U. S. Public Health Service whereby soldiers will receive a routine blood test as part of their separation physical examinations. All soldiers found to have syphilis in an infectious stage will be retained in the Army until they have received treatment sufficient to render them temporarily non-infectious. Information regarding soldiers whose blood tests at the time of separation indicate that hidden non-infectious syphilis may be present, and soldiers who have not completed the prescribed course of therapy in the Army will be referred to local health officers for follow-up so that uninterrupted treatment may be assured veterans who have not completed their course of treatment, and so that treatment may be instituted for veterans whose infections had not previously been discovered. Home communities will be protected against the spread of infection from returning veterans and at the same time the veterans will be protected against late ravages of syphilis.

Thus we approach the post-war period with every assurance that as a result of prompt, persistent, joint efforts on the part of both military and civilian authorities during the wartime venereal disease emergency, the venereal disease problem will not be out of hand, that continued and concerted action can succeed in breaking the chain of infection, and that the reduction in the incidence of venereal disease which was noted prior to the outbreak of hostilities can be resumed. To accomplish these ends, effective substitutes must be

TABLE 1

Semiannual Report of Contact Tracing on New Untreated Clinic Admissions in Six Selected Areas Serviced by Regional Tabulating Units

July–December, 1943

Diagnosis of New Cases	Area	Number of New Cases Admitted to Clinic (a)	Number of Contacts Reported (b)	Number of Contacts Reported per New Case (b)/(a)	Brought to Treatment (c)	Under Treatment Prior to Investigation (d)	Total under Treatment (e)	Epidemiologic Index (e)/(a)
Primary and Secondary Syphilis	I	354	960	2.71	110	41	151	0.43
	II	119	225	1.89	25	13	38	0.32
	III	194	246	1.26	37	23	60	0.31
	IV	380	417	1.10	57	61	118	0.31
	V	346	361	1.04	43	60	103	0.30
	VI	512	241	0.47	31	44	75	0.15
Early Latent Syphilis	I	480	533	1.11	48	17	65	0.14
	II	420	340	0.80	52	16	68	0.16
	III	387	312	0.80	27	38	65	0.17
	IV	594	473	0.80	40	94	134	0.23
	V	1,395	1,545	1.11	153	253	406	0.29
	VI	3,004	623	0.21	77	150	227	0.08
Other Syphilis	I	1,306	450	0.34	44	8	52	0.04
	II	531	337	0.63	36	11	47	0.09
	III	530	484	0.91	78	27	105	0.20
	IV	1,190	618	0.52	71	99	170	0.14
	V	1,664	953	0.57	128	123	251	0.15
	VI	2,282	440	0.19	56	89	145	0.06
Gonorrhea	I	3,006	2,944	0.98	642	76	718	0.24
	II	*	*	*	*	*	*	*
	III	1,432	953	0.66	151	67	218	0.15
	IV	1,510	1,072	0.71	97	112	209	0.14
	V	3,956	1,987	0.50	253	125	378	0.10
	VI	3,052	1,037	0.34	124	62	186	0.06
Other Venereal Diseases	I	336	198	0.59	10	4	14	0.04
	II	*	*	*	*	*	*	*
	III	25	11	0.44	2	1	3	0.12
	IV	109	59	0.54	5	4	9	0.08
	V	256	145	0.57	8	1	9	0.04
	VI	211	72	0.34	6	1	7	0.03

* No data available

Source: Clinic Population Reports and Semiannual Reports of Diagnosis of Infected Contacts, July–December, 1943—prepared by Chicago and Washington, D. C., Regional Tabulating Units.

found for the two effective wartime epidemiologic mechanisms, namely, Selective Service blood testing, and contact reporting by the armed forces to help break chains of infection. As a substitute for Selective Service blood testing, civilian health authorities must utilize more extensively routine blood testing among industrial workers, routine blood testing by hospitals and other medical agencies, routine blood testing of applicants for insurance, and premarital and prenatal blood testing, requirements for which should be broadened and strengthened. Private physicians must continue their efforts to look for and find venereal diseases in the active and latent stages, and to report contacts, spread as well as source. Contact investigation offers the most effective method of finding cases in the earliest and most infectious stages. Interviewing for contacts in private physicians' offices, in venereal disease clinics, in Rapid Treatment Centers, and in hospitals is vital. Prompt and effective follow-up is necessary, of course, but cannot succeed without accurate and complete contact reporting.

A tabulation has been prepared for six selected areas served by regional tabulating units in which the number of contacts reported by patients is com-

pared with the number of patients admitted. The ratio of contacts found infected to the original patients naming them, which is called an "epidemiologic index," was calculated. Since it may be assumed that each patient should have at least one infected contact, the theoretical minimum index is 1. The index may, of course, be greater than one, and the larger the index the more effective the epidemiologic program may be considered. For the six areas for which data are available, the index for primary and secondary syphilis averages about one-third (ranging from 0.15 to 0.43). It is also noted that the index varies directly with the ratio of contacts reported per new case which averages about one and one-quarter (range 0.5 and 2.7). This means that every 100 patients admitted with primary or secondary syphilis reported 125 contacts, from which 31 infections were located. Table 1 indicates clearly the important rôle interviewing for contacts plays in the case finding program. The highest ratio of contacts (including familial) per patient was 2.7, and the highest epidemiologic index was 0.43. These are the figures for routine contact tracing in the present venereal disease control program.

A special study in epidemiology based on contacts reported by 251 patients with early syphilis receiving intensive treatment at Cook County Hospital in Chicago, results of which have been made available to the author by the Illinois Social Hygiene League, gives a ratio of 5.8 contacts per patient and an epidemiologic index of 2.2. These figures indicate the contribution which can be made by skilled contact interviewing and persistent follow-up. It is not difficult to visualize the effects on the venereal disease problem of a contact investigating program which would result in the location of two infected cases for every admission to Rapid Treatment Centers, clinics, hospitals, and private physicians' offices. Obviously more productive interviewing is the prerequisite.

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Outbreak of Sodium Nitrite Poisoning

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SODIUM nitrite is manufactured chiefly for its use in the dye industry. It is also employed as an anti-corrosive in anti-freeze mixtures. For many years it has been used either alone or mixed with saltpeter in the curing of meat in order to bring out the red color, and as a preservative. The Bureau of Animal Industry of the Department of Agriculture allows nitrites to be used in curing meat, provided the finished product contains not more than 200 p.p.m. The salt is sold freely on the market. Heat used in cooking destroys nitrites, but it cannot be depended upon, since the amounts destroyed vary with the degree of heat and the length of cooking. Saltpeter, or sodium nitrate, is the salt more commonly used in curing meat. U.S.P. saltpeter is 99.5 per cent pure, but commercial saltpeter frequently has a large admixture of sodium nitrite. It is surprising that in spite of the ready availability of sodium nitrite, cases of food poisoning caused by the ingestion of this salt in food are unusual occurrences. No mention of such food poisoning is made in the standard texts of Jordan, Tanner, or Dack. The report of an outbreak of nitrite poisoning is therefore of interest.

On September 25, 1944, a report was received by the Department of Health from a hospital in lower New York City that 11 old men had been admitted to the hospital with cyanosis and shock. The investigation indicated that all of them had become ill that morning between 7:15 and 10 A.M. In each instance illness occurred within 5 to 30 minutes after eating breakfast in a cafeteria on Chatham Square. All were between 60 and 80 years of age and all were of the derelict type, living in cheap rooming houses on the Bowery. Seven of those ill lived in the same rooming house; the other four lived in different rooming houses of the same type, and were unacquainted with each other.

The clinical picture was similar in all. Within 5 to 30 minutes after breakfast, the involved individuals became dizzy, felt weak, and complained of abdominal cramps. Eight of them vomited and all had diarrhea. Five of them became unconscious shortly after onset of symptoms. All were admitted to the hospital by ambulance.

What impressed the admitting physician was the picture of shock that the patients presented. They had subnormal temperatures, cold extremities, and low blood pressures. In addition, all had cyanosis. In one patient, the cyanosis was over the entire body; in the rest it was chiefly of the lips, nose, ears, fingers, and toes. Blood counts and urine examinations were normal for the most part. They were treated for shock with bed rest, heat, and stimulant drugs. They also received gastric lavage and the more cyanotic patients got oxygen therapy. All but one patient recovered. This man, age 82, died the following morning. Autopsy revealed bronchopneumonia. The only other abnormal finding was a diffuse

mahogany brown discoloration of the organs.

In view of the cyanosis, the possibility of poisoning with one of the coal tar derivatives was thought of, and specimens of blood were obtained from each of the patients. These were examined spectroscopically.* Absorption bands for methemoglobin were found in all. The men were closely questioned about the use of drugs prior to their illness. All denied such use.

The restaurant in which the men ate is located in a poor section of the city and caters to men of very restricted means. It does not rate high in sanitation, lighting, or adequate kitchen equipment.

The men had become ill shortly after eating breakfast. All but one had eaten oatmeal, rolls, and coffee. One ate oatmeal only. The investigation was therefore directed toward this food. It was prepared by the cook at 5 A.M. and allowed to boil for 2½ to 3 hours. The dry oatmeal was obtained on the market in 5 lb. paper cartons. Four gallons of water were added, and a handful of salt. A similar handful of this when actually weighed equalled 101 gm. The mixture was stirred well before and during cooking and was kept simmering on the stove until all servings had been made. There were 6 gallons in the finished product and about 125 people were served, which made a serving equal to about 6 oz. There seemed no reason to suspect the dry oatmeal which was purchased in the usual commercial carton. The water used was from the city supply. The salt used for cooking was in a can near the stove. It had a faint yellow color. The cook stated that he filled the can from a supply on a shelf. There were two containers on this shelf, one filled with what appeared to be ordinary white-colored salt and the other filled with a yellowish looking salt. The owner stated that the latter was saltpeter, which he used in curing meat. Both containers and the can were embargoed and examined in the chemical laboratory of the Department of Health. The substance which looked like salt did actually turn out to be sodium chloride. The material in the other container and in the can was curing salt of which 92 per cent was sodium nitrite. The can had been filled from this container by mistake. None of the oatmeal was left, so that no determination was possible of the amount of nitrite ingested in the oatmeal by each individual. Since about 125 portions of oatmeal had been served, inquiry was made at the various hospitals serving the area and at rooming houses in the vicinity to determine if any other men had become ill. No evidence was obtained of any more cases. It appeared improbable that the oatmeal was the sole source of poisoning since it had been eaten by 125 men and only 11 had become ill. It occurred to us that the same error might have been made in filling saltshakers as in filling the can. Accordingly, we obtained 17 saltshakers used in the restaurant. The salt from 10 of them was pooled and chemical examination revealed 0.074 per cent of sodium nitrite. We requested examination of the contents of each of the remaining 7 saltshakers separately. One contained 0.137 per cent of sodium nitrite. 2 had only faint traces, and 4 had only sodium chloride.

As soon as we became aware of the possibility of nitrite poisoning, a chemical examination of the blood of the men in the hospital was requested. A pooled sample of the blood from the ten survivors was dialyzed through a collodion membrane. The dialysate was evaporated to a concentrated form with

* We are indebted to Dr. Alexander O. Gettler of the Chief Medical Examiner's Office for the spectroscopic determinations and for the chemical examination of blood.

low heat, and tested for the presence of nitrates and nitrites. The results indicated the presence of nitrites.

Since none of the cooked oatmeal was available, a batch was cooked for 2½ hours, using 1¼ lb. of oatmeal, 25 gm. of the "salt" from the can and 1 gallon of water. The ingredients used were in the same proportion and the cooking for the same length of time as in the original batch. A sample of the mixture contained 0.6 per cent of sodium nitrite before cooking and 0.1 per cent of sodium nitrite after cooking.* In the usual portion of 6 oz., there would be 0.18 gm. (about 2½ grains) of sodium nitrite.

COMMENT

The U. S. Pharmacopeia gives the average pharmacologic dose of sodium nitrite as 0.060 gm. or 1 grain. The British Pharmacopeia gives the dose as 0.03 to 0.12 gm. (½ to 2 grains). Soma Weiss and his coworkers conducted several studies on the effect of sodium nitrite on normal subjects. In one of these studies they established that a dose of 3 grains caused low blood pressure, pallor, sweating, nausea, dizziness, and finally loss of consciousness, when the subjects were tilted from a lying position to an angle of 75°.[1] The addition of a small amount of sodium nitrite to the portion of cooked oatmeal eaten would bring the total dose up to the toxic level.

As we reconstruct the picture, a number of individuals in the restaurant ate the oatmeal either without the addition of salt or with the addition of sodium chloride from the saltshakers that contained no nitrites. The 11 men who became ill must have used one of the few saltshakers that contained considerable admixture of sodium nitrite, bringing the intake up to toxic levels.

A search of the literature yields only a few reports of cases of nitrite poisoning. Most of these are in individuals, a few in family groups of two or three. The clinical picture in all of them is so much alike that one seems to be reading the same case history repeatedly. Onset of symptoms is dramatically sudden, very soon after eating the contaminated food. Nausea and vomiting are common, but the characteristic picture is one of cyanosis, particularly of the fingertips, nose, and ears, and the rapid loss of consciousness, frequently leading to death. The spectroscopic examination of the blood gives an absorption band characteristic of methemoglobin and at autopsy the only positive finding is a chocolate colored discoloration of the organs.

In most of the reported cases the nitrite was used in food, as in our report, under the mistaken notion that it was table salt. Padberg and Martin[2] report poisoning which caused death in three men who prepared a stew with salt obtained from a manufacturing plant. Examination of the stomach contents of the dead men as well as of the beef stew showed the presence of nitrites.

McQuiston[3] also reports on the death of three persons, a man, woman, and child, who used salt in cooking and in a saltshaker, which the man obtained from the plant where he worked. Analysis of the remaining food and of the salt in the saltshaker as well as of the stomach washings, showed large quantities of sodium nitrite.

A similar occurrence in three members of a family who used sodium nitrite in cooking is reported by Ruegg.[4] Here, too, the salt was brought home from the factory under the impression that it was sodium chloride. All three recovered after treatment.

* Andrew J. Pensa, chemist, Department of Health, performed the chemical determinations of the oatmeal as well as of the salts in the containers and saltshakers.

H. Huziter-Kramer [5] reported sodium nitrite poisoning in two small groups. In one of these, a father, mother, and daughter became ill soon after a meal in which sodium nitrite, brought home from the factory by the father, was mistakenly used for salt. Typical symptoms of vomiting, cyanosis, and loss of consciousness occurred and the patients were removed to a hospital. Nitrites were found in the stomach, and methemoglobin in the blood. All made recoveries. In the other group, two men became ill after eating pickled cabbage brought to the factory by a fellow worker, which was liberally sprinkled with salt from the factory. Both men died, and sodium nitrite was recovered from the stomach as well as in the remains of the lunch.

Four cases described by Musso [6] were given sodium nitrite in a drugstore in Algeria in a purgative lemonade. The native druggist took the nitrite from a bottle labeled "sodium tartrate." All four died. A similar error in which a druggist gave two infants aged 3 months and 2 months sodium nitrite instead of sodium citrate as a cathartic caused illness in both and death in one of them.[7]

Single cases of sodium nitrite poisoning have been reported by Palmer,[8] Arbuckle and Thies,[9] Naidu and Rao,[10] and Molitaris.[11] All were fatal cases. A fatal case of poisoning with potassium nitrite is reported by Farinand and Woltz.[12]

The uniformity of clinical symptomatology and the high fatality rate is striking in the reports from the literature. The chances of death depend largely, in all probability, on the amount of nitrites ingested. In the outbreak reported here only one death occurred among 11 cases. According to our calculations, most of the men took a little more than the pharmacologic dose, so that although they became seriously ill, they made an eventual recovery.

SUMMARY

1. An outbreak is reported in which 11 men were poisoned by eating oatmeal in which sodium nitrite was used instead of table salt, and on which, in all probability, additional sodium nitrite was added from saltshakers.

2. Symptoms began immediately after the meal and consisted of nausea, vomiting, cyanosis, shock, and loss of consciousness. One death occurred.

3. Methemoglobin was found in the serum of each case and nitrites were recovered from a pooled specimen of the bloods.

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"SCRUB TYPHUS"

As the second in our series of Special Review Articles, we are fortunate in obtaining for the present issue of the Journal, a summary of Army studies on the mite-borne typhus of the Pacific areas by Blake and Maxcy, and their colleagues. The problems involved are not directly significant in the continental United States; but they will be important for us as a nation, since we shall certainly be responsible for a long time to come for the administration of strategic bases in the affected regions. The public health expert, at home, must have at least an intelligent comprehension of the major tropical diseases and the methods for their control.

The particular malady now under consideration is of considerable historical interest. We are accustomed to date our knowledge of the spread of infection by insects, mites, and ticks, from the Texas fever studies of Smith and Kilborne in 1893; but according to Ashburn and Craig, fever due to a mite was mentioned in Chinese writings more than a thousand years ago; and the Japanese name Tsutsugamushi fever carries the same connotation. A historical analysis of these origins would be of fascinating interest.

The studies reported by Blake and his colleagues were made chiefly in New Guinea under the auspices of the U. S. Army Typhus Commission and the Board for the Control of Influenza and other Epidemic Diseases; and dealt primarily with the condition known commonly as "scrub typhus" in that area. The investigators find no significant differences between the scrub typhus of New Guinea and the tsutsugamushi disease of Japan. Clinical variations are slight. Both infections appear to be caused by strains of *Rickettsia orientalis*; both show a specific reaction with the Proteus strain OXK, but not with OX_{19}; both are apparently spread from various wild rodents by the ticks of the genus *Trombicula*, or closely related forms.

No success has yet been attained in the preparation of vaccines or sera. Vaccines made from suspensions of *Rickettsia prowazeki* confer no protection.

Perhaps the most interesting phase of this study is its field epidemiology. The Commission demonstrated that infection occurred during temporary bivouacs, or

in the first week or so of the occupation of new camps, in areas where kunai grass fields offered conditions for mite harborage; and these conclusions were checked by studies of the nymphs of mites obtained from boot collections and from indigenous rodent hosts. These observations naturally indicate practical control procedures involving cutting and burning of scrub, avoidance of sleeping on the ground, and personal cleanliness. Under field conditions—where these ideals cannot be attained—reliance must be placed on impregnation of clothing and socks with effective anti-mite fluids, such as dimethyl or dibutyl phthalate. Unfortunately, the protection thus provided is lost in the course of a week or two; and the miracle-working DDT is not effective against mites.

THE TEST OF KING SOLOMON

IT will be remembered that when each of two women claimed the same child as her own, Solomon suggested that the child be cut in half, and recognized as the true mother the one who refused this eminently practical arrangement. The child of school age is today the victim of a somewhat similar conflict between the Board of Health and the Board of Education.

For this problem there is no simple solution. Classroom instruction is clearly the duty of the school. Certain aspects of health protection fall clearly within the province of the health officer. In between, are such functions as school medical inspection and school nursing which are sometimes performed by one agency, sometimes by the other. When two functional agencies converge on a single person or group of persons, there is no way of resolving the difficulty except through an ordered program of coöperation.

In the way of general overhead planning for such coördination, considerable progress has been made. On the federal level, the U. S. Public Health Service, the Office of Education, the Children's Bureau, and the War Food Administration coöperated in two regional conferences, one in Chicago in November, 1934, and one in Atlanta in January, 1944. Their objective was to stimulate representatives of departments of health and of education toward better coördination; and definite results were attained as a result of these conferences in several states.

On the state level, Illinois and Kansas have organized Joint Committees on School Health, with the aid of C. E. Turner as their consultant. In Illinois, the State Department of Public Health, the State Office of Public Instruction, and the State Department of Registration and Education formed a joint council with active subcommittees, which have prepared two valuable reports on basic plans for health programs in the schools and in teacher training institutions. The fact that Illinois has adopted a definite policy of placing a trained health educator in every local full-time health department is an important element in the state program.

North Carolina established, several years ago, a school coördinating service composed of representatives of the Department of Education and Department of Public Health to demonstrate coördinated school programs. For a time the Coördinating Service tried using a team of highly trained personnel (a doctor, nurse, nutritionist, etc.) to visit counties and demonstrate excellent school health service. The length of time for which they remained in a county was not, however, sufficient to bring about any marked changes in county practices. The Service has now embarked on a program for a trained health educator in each

county to work in the community on the long-time job of improving health education. This program has been aided by the General Education Board.

In Georgia, a coördinating committee composed of three members of the State Department of Health, three members of the State Department of Education, and one representative of the Teaching Training Council has been formed. Only recently has it been possible to employ any staff. A workshop for teachers was planned for the past summer.

In Mississippi, coöperation is carried a step further, by the use of a joint staff under the coördinate direction of a representative of the State Department of Health and a representative of the State Department of Education. This would hardly be a sound administrative arrangement for general application but seems to work well in the case of the personalities concerned. The staff provides in-service training throughout the state in the carrying on of school and community health education programs. It has actively promoted the employment of trained local health educators, responsible to the local health officer, but supported by county and city boards of education as well as by state and local boards of health. This Mississippi program has also been aided by the General Education Board.

An even more radical step has been taken in Indiana through the appointment of a common Director of Health Education for the Department of Health and the Department of Education. Mr. Frank Stafford was the director of health and physical education for the two departments for eight years before going to the Federal Office of Education. The position is now held by Mr. Yoho. He is paid by the Department of Health, but serves both departments. Both departments share in the provision of educational materials and supplies. To further the coördination in local areas, competent personnel are being recruited and trained to serve as local health education coördinators. For the past two summers the State Health Department has planned a workshop with the coöperation of the State University. Local health departments participate in the workshop with local teachers attending. Stipends are paid by the State Department of Health.

In Tennessee, a Director of Health Education serves the Departments of Health, and of Education, the State University, and the Tennessee Valley Authority in its work in Tennessee. Each of the four organizations contributes to his salary.

An important contribution on the local level has been made by the W. K. Kellogg Foundation in stimulating school and community Health Service Projects. This movement grew out of attempts in Michigan to interest high school seniors in health services such as nursing, laboratory work, dental hygiene, and the like. Grants for such projects in secondary schools have been made by the Foundation in 22 states.

Not all the programs to which we have referred have proved successful. Most of them have, however, contributed to a better understanding of the problems involved; and some have reported notable achievement. Results can be satisfactory only when there is a competent health educator at the heart of the organization and when his or her efforts have the real support of the officials and the agencies concerned. The need for some machinery of this sort is, however, clear. When the health officer or the teacher or the nurse says, "Oh, yes, we have fine coöperation. I know to whom to go when there is any trouble, and we always get it straightened out"—then you know that no one has ever visualized what a school health program should be. No real mother is revealed by Solomon's

test—for a true school health program is something quite different. It is positive, not negative. It involves continuing coöperative planning for meeting all the health needs of the child, not avoidance of friction. No community has begun to do its duty until it has set up some sort of a coördinating group, including representatives of the health department, the school doctors, the school nurses, the physical educators and the classroom teachers and supervisors, to meet at regular stated intervals and to promote and continuously develop a really complete program for the physical and emotional health of the Americans of the future.

THE SEEING EYE IN TUBERCULOSIS CONTROL

THE war has had its inevitable effect on the seriousness of the problem of tuberculosis; but that effect has not been serious in countries like the United States and Great Britain. It has, however, even in such fortunate areas, checked previous declines and caused slight increases.[1] We have still a job to do; and we know how to do it. The traditional tuberculosis program, based on prompt detection of clinical symptoms (aided by general improvement in economic status) has cut the rates for our large American cities from 400 per 100,000 a century ago to 40 or less. The control of this final residuum must depend on the detection of preclinical disease by the use of modern scientific methods which serve the diagnostician as the Alsatian does the blind man.

It is most important that this almost miraculous procedure should be used effectively and economically. When the new procedures were first introduced, we all started off on comprehensive x-raying of elementary school children. Educational authorities in some parts of the country still advocate this procedure; but experience has shown that the practical results are so meager—and have so little practical significance—that routine examinations at this age are wasteful of money and of even more valuable expert time. Tuberculin testing of entering children may be useful in locating family foci of infection; and at the close of school life x-raying is desirable. Between these periods, such examinations should be limited to contacts and to children who exhibit suspicious pulmonary symptoms.

Certain small communities have initiated mass x-ray surveys covering their entire population. Such studies are of significant value as research procedures but are not practical—probably not justifiable—as parts of our general administrative health program. If the seeing eye is to lead us most directly to our goal—the elimination of tuberculosis—it should be applied, first and foremost, to the following groups of our population:

1. Persons with suspicious pulmonary symptoms
2. Contacts with known cases of tuberculosis (as defined by Edwards, persons in intimate and prolonged or repeated association with an open case of chronic pulmonary tuberculosis showing positive sputum or evidence of cavitation by x-ray)
3. General hospital admissions, a class which has been strangely neglected in the past
4. Members of racial groups which—for genetic or economic reasons—show abnormally high incidence of tuberculosis
5. Workers in trades exposed to silica dust

The relative importance of the last two categories will obviously vary in different localities. Either a silicosis group or a racial group may furnish the most promising point of attack (next to contacts) in a given community. Medical

students, nurses, and inmates of hospitals for the insane also deserve special attention.

In formulating administrative policies, we must always balance theoretical ideals by consideration of problems of practical convenience. High school children and industrial workers furnish unique opportunities for the actual conduct of an x-raying program; and the industrial group gives us access to both of the last two categories of promising prospects.

It is for this reason that industrial x-ray programs are likely to play a major rôle in tuberculosis control during the next decade. The Connecticut State Tuberculosis Commission has embarked on an extensive campaign along this line. Another excellent program has recently been inaugurated by the Onondaga Health Association centering at Syracuse, N. Y. In the year 1944, 9,120 workers were x-rayed, using miniature films, followed in suspicious cases by standard large x-rays. Thirty-three cases of active tuberculosis were revealed, of which about one-half required hospitalization; the rest, home treatment. If the ratio holds for the city in general, there are nearly 200 more cases in Syracuse industries awaiting discovery. On such a basis, the Syracuse Health Department and the Onondaga Health Association estimate that, for every 1,000 employees x-rayed, 2 to 4 active cases will be found and that the amount of money needed to pay for the hospitalization will be $2,400 to $4,800.

The health administrator should keep in close touch (through the N.T.A., the A.P.H.A., and the U.S.P.H.S.) with advances in both technical and administrative procedures, which are coming fast. Morgan, of the University of Chicago, has described a useful device for an automatic control of exposure in photofluography.[2] Palmer,[3] of the U.S.P.H.S. has presented an analysis of an important factor in the interpretation of the films obtained; and we present in the present issue of the JOURNAL a more extensive study of this problem by Christie and Peterson.[4] In the east-central states (between Maryland, North Carolina, Arkansas, and Iowa), roentgenograms reveal an abnormally high proportion of pulmonary calcification (28 per cent in Kentucky as compared with 6 per cent in Oregon). The prevalence of this phenomenon is not closely correlated with tuberculosis rates. The Palmer and Christie studies indicate that it *is* correlated with reaction to histoplasmin tests and suggest that in tuberculin-negative individuals a high proportion of calcification may be due to subclinical infection with *Histoplasma* organisms.

From an administrative standpoint, the description of New York City's tuberculosis program,[5] published by Edwards and Robins two years ago, still constitutes an excellent manual of procedure. More recently, we have presented in the columns of this JOURNAL an account by Graves and Cole[6] of the administrative program in operation in Memphis and Shelby County, Tennessee. Dr. Graves has worked out practical coöperation between the Health Department, the Sanatorium, the Public Health nursing staff of the community, and the local tuberculosis society, which is worthy of emulation. Admirable relationships have been established with the local medical profession, and pneumothorax cases are freely exchanged between the doctor's office and the clinic, according to changes in income. It is of interest to note that the age group 16 to 35 showed an incidence of 5.5 per cent positives and yielded 48.6 per cent of all cases found; while the 36 to 55 year old group showed 11.6 per cent positives and yielded 32.4 per cent of all cases found. The group under 16 gave only 1.9 per cent positive results. It is of particular interest to note that contacts and suspects yielded 8.0 per cent

positive results, while all other examinations (high school students, medical students, prenatal cases, etc.) yielded only 2.9 per cent. (It should be noted that the Graves classification of "positives" is more inclusive than that suggested by Edwards, comprising all x-rays interpreted as indicating chronic, active, or arrested tuberculosis.) The cost of the tuberculosis program to the Health Department (less than 2.5 per cent of its total budget) was $1.50 per x-ray film and $39.72 for each active case found. With economies made possible by current improvements in technique, the wider extension of the case finding program to industrial groups and to the Negro population should be readily possible.

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LETTER TO THE EDITOR

TO THE EDITOR:

I should like to make a few comments on the excellent report of Paris R. Eastman on Infant Mortality in Relation to Month of Birth published in the September 1945 issue of the Journal. This study which relates infant deaths to the month of birth presents results that are of considerably more interest and value than one based on monthly infant mortality rates as conventionally computed. Contrary to general belief, the "infant mortality rate" ordinarily computed by relating infant deaths occurring during a month to the births occurring in the same month is not a probability figure at all because deaths of infants under 1 year occurring during a particular month do not all arise from the infants born during the same month. Therefore, for precise analysis of the infant mortality problem, the numerator and denominator of the infant mortality rate should be brought into correspondence by a method such as that employed by Eastman. As shown by our study entitled The Effect of Changing Birth Rates on the Infant Mortality Rate (Vital Statistics—*Special Reports*, vol. 19, No. 2), even the conventionally computed *annual* infant mortality rate may lead to erroneous interpretations during periods of changing birth rates such as the present. Because of the large seasonal swings in births, monthly infant mortality rates should always be corrected if probability values are to be obtained.

The author states in his paper that greater refinement in determining the month of birth in his study was not possible since the Census Bureau did not give the exact age (i.e., in days) at death. This statement gives the impression, which I am sure that the author did not mean to convey, that it is necessary to tabulate every infant death by age to the nearest day. Since

the greatest differential in rate occurs during the first few weeks of life, it would be sufficient to tabulate neonatal deaths only by a more detailed subdivision of age of less than a month. The Bureau of the Census published such a tabulation each year in the annual reports which permits a fairly precise allocation of infant deaths to the month of birth. However, these tabulations are for total infant deaths only, and not by cause of death.

The author appears to make quite a point of the lack of data in a suitable form for the study. While the publication of the tabulation of infant deaths by cause of death, by month of death, by age was discontinued in 1939, the data were tabulated. In this connection it may be of interest to the reader of the Journal to know that the Bureau of the Census tabulates a large volume of statistics each year but because of the physical impossibility of publishing all of the tabulated data, only a relatively small portion find their way into the publications. The fact that certain tables have not been published does not mean that the data are not available. In most cases, the Bureau will supply the information upon request without charge. If considerable work is involved in preparing a special table, a nominal fee is charged. If there is sufficient demand for any particular unpublished tabulation, one can be sure that it will be made available to the public in published form at the earliest opportunity.

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Washington, D. C.

BOOKS AND REPORTS

All reviews are prepared on invitation. Unsolicited reviews cannot be accepted.

All books reviewed in these columns may be purchased through the Book Service.

A Manual of the Aspergilli—*By Charles Thom and Kenneth B. Raper. Baltimore: Williams & Wilkins*, 1945. 373 pp., 76 figs., 7 colored plates. Price, $7.00.

This *Manual* has been prepared to provide the worker who is interested in aspergilli with a means for their identification. At the same time, all forms described or mentioned in the literature are enumerated and their proper place in the group is indicated.

It is based on a study of the cultures now in the Northern Regional Research Laboratory of the U. S. Department of Agriculture, Peoria, Ill. This collection of cultures was developed under the guidance of the senior author and owes much of its completeness to the care given it by Dr. Margaret B. Church who collaborated with Dr. Thom in a previous monographic treatment of the same group of molds in a book entitled "The Aspergilli."

The book begins with a historical introduction and discussion of the classifications proposed for the aspergilli and with an explanation of their morphology, variation, methods of cultivation and preservation. The key which permits recognition of the group to which any unknown culture belongs precedes 14 chapters devoted to a discussion of the 14 groups recognized. The groups are indicated by the name of a distinctive species as follows: *Aspergillus clavatus, A. glaucus, A. fumigatus, A. nidulans, A. ustus, A. flavipes, A. versicolor, A. terreus, A. candidus, A. niger, A. wentii, A. tamarii, A. flavus, A. bryzae* and *A. ochraceus*. The third part of the book covers reference material, including a classified as well as a general bibliography. Check lists of described genera, species, and varieties are also given. The *Manual* will be classed as indispensable by all students of this group of molds.

ROBERT S. BREED

Medical Nursing—*By Amy Frances Brown, R.N., M.S.N. Philadelphia: Saunders*, 1945. 579 pp., 153 illus. Price, $2.75.

This is an ambitious book, covering the aspects of nursing care of some two hundred conditions in medical patients. It serves as an authoritative reference, with excellent bibliographies, to diseases of the respiratory, digestive, circulatory, and nervous systems, with shorter sections devoted to nursing in communicable diseases. Assistance in writing many of the chapters—such as nursing in allergy and fever therapy—has been secured from specialists, and up-to-date material is included related to nursing in nutritional diseases.

It is inevitable that such an encyclopedic presentation should be uneven. The first four chapters are by far the best. They deal with the general principles of nursing the critically ill, the long-time ill, and medical emergencies. The section on communicable diseases is incomplete, many of the virus-caused diseases being omitted. It seems unfortunate that poliomyelitis was among these.

There is sufficient basic and essential information to make Miss Brown's "compendium" a useful reference for staff use in public health agencies. It does not, however, stress prevention,

home care, or family health instruction. It is for the most part centered in the hospital situation.

DOROTHY DEMING

Men Under Stress—*By Roy R. Grinker, Lt. Col., M.C., and John P. Spiegel, Major, M.C. Philadelphia: Blakiston,* 1945. 484 pp. Price, $5.00.

Men Under Stress is an exceptionally well written and well organized book on the psychoneuroses precipitated by the stress associated with military life and aerial combat. The material for it was obtained through the personal experience of the authors in the treatment of many cases in the combat area and at a convalescent hospital in this country. The men who were selected for service in the Air Corp are described, the environment to which they were subjected is presented and their reactions both to combat and upon return home are given. The authors in conclusion generalize as to the applications for civilian psychiatry and the general social implications.

The neurotic responses are grouped under six types of reactions: "operational fatigue," passive dependent states, psychosomatic states, guilt and depression, aggressive and hostile reactions, and psychotic-like states. The dynamics of each type of reaction are discussed and each is illustrated with well chosen and exceptionally well abstracted case histories. The vividness of these case abstracts is enhanced by the inclusion of verbatim productions of the patient while under the influence of sodium pentothal. Various methods of treatment are described and their results evaluated. Methods particularly useful to the flight surgeon and general practitioner are indicated, as well as the more specialized procedures of the psychiatrist.

The book is written within the frame of reference of psychoanalytic theory. The style and terminology are such that the intelligent layman as well as the physician should be able to read and enjoy one of the most significant books to come out of the war.

JAMES M. CUNNINGHAM

Animal Colony Maintenance—*By Edmond J. Farris, F. G. Carnochan, C. N. W. Cumming, Sidney Farber, Carl G. Hartman, Frederick B. Hutt, J. K. Loosli, Clarence A. Mills, and Herbert L. Ratcliffe. New York: N. Y. Academy of Sciences,* 1945. 126 pp. Price, $1.50.

This book consists of papers presented before a conference on Animal Colony Maintenance held by the Section of Biology of the New York Academy of Sciences. The first paper stresses the importance of reducing variability in stocks of experimental animals by as strict inbreeding as is possible without loss of vigor and good reproduction: seemingly minor variations and mutations may have far-reaching effects upon physiological traits. Perhaps the most unique feature of the symposium is a paper summarizing information on the physiology of estrus and mating, and giving practical instructions for making accurately timed matings of a variety of laboratory and domestic animals. Two papers summarize large amounts of information on nutritional requirements and infectious diseases of laboratory animals. A paper on the influence of environmental temperatures on warm-blooded animals reviews the physiological changes attendant upon high temperatures and emphasizes the importance of maintaining animal colonies at uniform temperature if experimental results are to be uniform and reproducible. Two papers on the finances of animal colony maintenance, (1) in a large university, and (2) by a large commercial breeder, concludes the symposium. Most of the papers are fully documented with references to the original studies. PAUL A. MOODY

Methods for Determining Lead in Air and in Biological Materials—*A report prepared by the Subcommittee on Chemical Methods of the Committee on Ventilation and Atmospheric Pollution of the Industrial Hygiene Section of the A.P.H.A. New York: A.P.H.A.*, 1944. 41 pp. Price, $.75.

This booklet was written by Professor J. Cholak of the Kettering Laboratory of Applied Physiology of the University of Cincinnati. It reflects the vast experience which that laboratory has had in the estimation of lead when present in minute quantities.

Several dithizone methods and the use of the spectrograph and the polarograph are described in sufficient detail to permit an understanding of the principles underlying each method and to enable the inexperienced analyst to appreciate the difficulties encountered in each of the various procedures. Some of the procedures can be followed by such analysts so that successful results may be obtained after some trials. It is perhaps unfortunate that the titration method of Wilkens, Willoughby, and others has been described rather than that of Horwitt and Cowgill, since the latter method does not require the use of relatively unstable dithizone solution as a standard.

The sections on Collection and Preparation of Samples for Analysis are excellent for biological materials but inadequate for air sampling—only about 8 per cent of the text in these sections deals with air-borne samples. The reason given for the low efficiency of the impinger for the collection of fumes and fine dusts is not that usually given. An absorption train for the collection of lead in air is not generally used by industrial hygienists because of the low sampling rate and probable inefficiency of absorption. The more recent procedure of collection on filter paper is not mentioned. However, the analytical methods are equally applicable to samples collected from air and of biological materials, with the possible exception that it is probably unnecessary to analyze samples of air-borne lead-containing material with the high degree of accuracy obtainable with the use of the spectrograph.

Despite the weakness of the section on collection of air-borne samples, this booklet is a valuable addition to the library of the industrial hygienist. The "selected bibliography" is sufficiently complete so that additional details on any of the analytical methods can be obtained by those who are interested.

SAMUEL MOSKOWITZ

Fluorine in Dental Public Health—*A Symposium by Frederick S. McKay, D.D.S., H. Trendley Dean, D.D.S., Wallace D. Armstrong, M.S., Ph.D., M.D., Basil G. Bibby, B.D.S., Ph.D., D.M.D., David B. Ast, D.D.S., M.P.H. New York: New York Institute of Clinical Oral Pathology*, 1945. 62 pp. Free from publisher.

The five papers published in this 62 page booklet tell the very interesting story of the relation of fluorine and the teeth. Beginning in 1908, each major development is traced without a great deal of detail.

McKay cites the evidence indicating that fluorine was responsible for the aberrations of the teeth now known as dental fluorosis. Dean reveals how the relationship between dental caries and relatively low amounts of fluorine in the potable waters was found. His study of the permanent teeth of children in the eight communities near Chicago having waters of varying amounts of fluorine will probably remain a classic in dental epidemiology.

An important chapter is added by Armstrong when he shows that the fluorine content of the enamel of carious teeth is only 62 per cent of that of sound teeth. Bibby's paper shows that caries experience rates in

young permanent teeth calcified on fluorine-free waters can be depressed by multiple applications of fluorine solutions after the teeth have erupted. Using the facts presented, Ast outlines the controlled experiment needed to demonstrate that dental decay can be materially reduced in large masses of the population—at a cost of 5 cents per capita.

A complete bibliography of all research in fluorine permits the reader to refer to original data of other workers as well as those taking part in the Symposium. WALTER J. PELTON

Housing for the United States After the War—*By National Association of Housing Officials. (2nd ed.) Chicago: National Association of Housing Officials,* 1944. 64 pp. Price, $.50.

The Postwar Housing Committee of the National Association of Housing Officials outline in this book their conception of the major elements upon which a housing policy for the United States must be based. The objective must be that of providing adequate housing for all the people. The use of both public and private enterprise in the proper proportion is urged as essential in order to secure such adequate housing. The problem is discussed for both urban and rural communities. Regulations for new and existing housing, planning for new housing in suitable neighborhood environments, governmental assistance for land acquisition in order to clear slums, and protecting existing neighborhoods, are some of the important urban problems that are discussed in some detail. Housing for rural areas, however, must be planned in relation to land use and with a realization that there are differences between urban and rural housing. The types and designs of farm housing, the farming community, and the necessity for financing rural home building in economic farm areas, are discussed.

Housing is fundamentally a local problem arising from local conditions. Facts objectively collected are essential to an understanding of the problem and as a basis for an intelligent program. Leadership at the local level is required to stimulate coördinated action by all those agencies whose individual programs provide answers to various phases of the problem. The local building, planning, enforcement, welfare, public housing, zoning, and taxing problems, as they affect the overall housing situation, must be stimulated, coördinated, and rationalized on the basis of the actualities in each specific community. This book should be in the hands of all public health officials having a personal concern for the physical elements which support community life, one of which is shelter.

ALFRED H. FLETCHER

Jurisprudence for Nurses — *By Carl Scheffel, M.D., in collaboration with Eleanor McGarvah, R.N. (3rd ed.) New York: Lakeside Publishing Co.,* 1945. 264 pp. Price, $3.00.

After reading the third edition of this well known reference book for nurses, the reviewer wonders how any nurse dares practise without the knowledge of her legal status so clearly described by the authors!

This new edition covers all the problems familiar to nurses in home, hospital, and clinic services, such as responsibility in relation to wills, slander, criminal negligence, contracts, and bearing witness, and adds new material on recent court decisions, the latest medical and nurse practice acts (Canada included), and up-to-the-minute information regarding registration for the returning nurse-veteran. Questions and answers for the use of teachers are appended.

It seems unfortunate to this reviewer that more is not said regarding the nurse's status under civil service or

merit systems. That section which refers to the problems in federal employment is also meager when one considers the greatly increased staffs employed by Uncle Sam.

The index is too general to be helpful. Otherwise it is a valuable reference book.

DOROTHY DEMING

Handbook of Practical Bacteriology—*By T. J. Mackie, M.D., and J. E. McCartney, M.D. (7th ed.) Baltimore: Williams & Wilkins*, 1945. 720 pp. Price, $5.00.

The new edition of this well known book carries on the tradition of previous editions. As the title indicates, it is not a textbook but is devoted mainly to techniques and contains only a synopsis of basic principles. There are 3 main parts, of which the first, Introductory, consists of 2 chapters dealing with The General Biology of Microörganisms, and Immunity in Relation to Practical Bacteriology. Part II contains concise practical details on microscopy, cultivation, staining, animal handling, immunological techniques, and a chapter combining techniques of milk and water contamination, disinfectant testing, and collection and forwarding of specimens for bacteriological examination, all according to British requirements. Part III comprises the latter half of the book and deals with specific pathogenic bacteria and their relation to disease, and with pathogenic rickettsia, fungi, protozoa, and viruses. Technical details on filtration are also given.

The book is naturally British in viewpoint, and in several details is quite at variance with American ideas. For example, it is stated that if diphtheria organisms "present all the characters of the *gravis* type, virulence is generally assumed without resorting to an animal test." Such an assumption in the United States would lead to very grave error.

An appendix is added, "for the inclusion of new contributions to bacteriological knowledge and technique which had assumed special importance after the text had already been revised." An attempt has been made to link this appendix, containing several new techniques, to the old main text by appropriate references. The book is almost without illustrative matter, a half dozen or so simple line drawings and a few tables serving for the purpose. It is well bound and printed, contains a useful index, and should prove of value on the reference shelf of the laboratory bacteriologist.

MARTIN FROBISHER, JR.

Disinfection and Sterilization—*By Ernest C. McCulloch, D.V.M. (2nd ed) Philadelphia: Lea and Febiger*, 1945. 472 pp. Illus. Price, $6.50.

The second edition of this book has been completely rewritten. The chapters on heat, particularly pasteurization, have been condensed so that only pertinent material is included. A brief summary of the sulphonamides and the antibiotics of microbial origin is presented.

Admittedly the literature on disinfectants is very conflicting but the author in his chapter on mercurials could have clarified this group for his reader. The citing of literature, without explanations of results, is apt to be confusing.

The review of the quaternary ammonium compounds is fragmentary. The statement "Zephiran is the only cationic detergent which has been actively recommended as a bactericide" is rather unfair to the other quaternary ammonium compounds that are on the market. The author separates the quaternary ammonium salts into two groups, namely the synthetic detergents, Cephiran, Roccal, etc., and the quaternary ammonium salts, although all these compounds belong in the same group.

The author has, however, presented a

very complete review of the field of disinfection and sterilization. Each chapter carries a well selected list of references. The book should be accessible to all bacteriologists and public health workers. W. L. MALLMANN

Pulmonary Tuberculosis in the Adult—*By Max Pinner, M.D. Springfield, Ill.: Thomas,* 1945. 579 pp. Price, $7.50.

A "must" book for tuberculosis workers is Dr. Max Pinner's *Pulmonary Tuberculosis in the Adult*. This work maintains the high standard set by Rich in his *Pathogenesis of Tuberculosis*, and supplements it by providing valuable clinical material and judgment. It resembles Rich's book in quoting extensively from the European literature and in its critical attitude toward many conclusions and dogmas. Illustrating the spirit of the volume, the author refers to one problem as "open to sterile speculation and probably fertile research."

This reviewer is struck and pleased by Dr. Pinner's treatment of the bibliography. He not only gives extensive chapter references, but succinctly states each author's main theme and frequently evaluates the work. To be sure, some 125 pages are consumed by these references, but presented in this way they are far more valuable to the average reader than when merely listed by name and title.

Dr. Pinner holds that the degree of the skin reaction to tuberculin is no measure of the existing immunity, but insists that experimenters should prove by means other than the skin reaction that "desensitized" animals are not allergic.

An excellent chapter deals with phthisiogenetic principles under the subheadings of morphological and causal phthisiogenesis. The term "epituberculosis" should be discarded because of its varied connotations. A helpful distinction is made between miliary and non-miliary hematogenous tuberculosis. Sarcoidosis is still considered by this author to be a form of non-caseating tuberculosis. The great importance of the bronchial factor in cavitation and in the healing of cavities is emphasized.

Under diagnosis, the author stresses the importance of the availability of free-x-ray examinations of the chest. He advocates premarital chest x-rays.

The physiological principles of respiration and the physiological and pathological principles of pulmonary collapse are discussed in a modern way. The author appears not to be an extremist in advocacy of collapse therapy or of any particular type of the latter, though preference is given to pneumothorax, with pneumolysis when indicated, and to thoracoplasty. He judiciously remarks that "non-clinical aspects favoring particularly frequent use of collapse therapy are: slight appreciation of (or lack of experience with) results of adequate bedrest, seeing as the main aim of treatment the conversion of sputum and not cure of the individual patient, and lack of prolonged follow-up observations."

Dr. Pinner discusses in his closing chapter epidemiological principles. He shows that our morbidity data in tuberculosis are woefully incomplete, that fatality rates cannot be accurately estimated, that even mortality rates are subject to many flaws. Tuberculosis in a virgin population follows a definite course, being at first like an acute infectious disease, later more chronic and more productive, with the age incidence shifting slowly to the higher age groups. The factor of heredity is given more prominence than in most writings.

Dr. Pinner succeeds unusually well in accomplishing his purpose which, in his own words, is "to create understanding, to form rational and consistent attitudes and approaches to the problem

as a whole, to provide the basically necessary foundations on which the practical work should proceed."

JOHN H. KORNS

Constitution and Disease: *Applied Constitutional Pathology — By Julius Bauer, M.D. (2nd ed.) New York: Grune & Stratton,* 1945. 247 pp. Price, $4.00.

The objective of this book is a very worthy one. There is a great need for more attention to be paid to the constitutional factors in disease. Emphasis for the most part has been placed by investigators on the external factors which affect health and disease, and Dr. Bauer makes a plea for more attention to the constitutional factors.

Although a great mass of information has been compiled in this little volume, and even though the conclusions of the book may eventually be shown to be correct, they have not been established by the argument of the book. Many of the statements are justified by the citation of individual cases. The principles of sampling and of the use of controls have been seriously disregarded. When facts fail, the voice of authority has been called upon to justify statements. Even though the author is highly critical of the theories of others, he seems perfectly willing to accept without documentary facts the theory of variations in genetic constitution to explain away a large number of medical problems.

It is a pity that this book is not an adequately documented treatise on the constitutional aspects of medicine, the need for which is so obvious.

DAVID D. RUTSTEIN

Voluntary Health Agencies. An Interpretive Study—*By Selskar M. Gunn and Philip S. Platt. New York: Ronald Press,* 1945. 364 pp. Price, $3.00.

See Editorial "A Challenge to the Voluntary Health Agency" in the October issue of the JOURNAL, page 1070.

A SELECTED PUBLIC HEALTH BIBLIOGRAPHY WITH ANNOTATIONS

RAYMOND S. PATTERSON, PH.D.

Crank Gets Jolt—In England, a learned justice has decided that anti-vivisection societies are not established "for charitable purposes only," and that the attainment of their objectives would be injurious to public welfare. Hence contributions to them are not exempt from tax. Wonder what stand our federal taxing authorities take in this matter?

ANON. Anti-vivisection Societies and the Income Tax. Brit. M. J. 4417:291 (Sept. 1), 1945.

Only Cancer of the Lung Increases—The outlook for the control of cancer is definitely promising. So begins a brief summary of the heartening statistics which give reason to the belief that real gains are being made.

ANON. Encouraging Trends in Cancer Mortality. Stat. Bull., Met. Life Ins. Co. 26, 7:1 (July), 1945.

Epidemiologic Study—A boy coming to camp with incubating poliomyelitis was placed in a cabin with six others. About two weeks later virus was recovered from five of the six and a second case developed in one of these five. The study confirmed the fact that virus may be present in the intestinal tract for some time before as well as during and after the attack.

BROWN, G. C., *et al.* Rapid Development of Carrier State and Detection of Poliomyelitis Virus. J.A.M.A. 129, 2:121 (Sept. 8), 1945.

"Most Remarkable Therapeutic Agent"—Rules are made to be bent, if not broken, so the proscription against including strictly medical papers in this sanctuary of public hygiene will be pushed gently ajar just far enough to let me whisper to you that I found a lot of pleasure in reading this authoritative free-for-all on penicillin. You will too. Dr. Keefer has an outstanding paper on the same topic in the August issue of American Journal of Medical Sciences—I may as well be hung for a sheep as a lamb.

CATTELL, MCK., *et al.* Conferences on Therapy: Penicillin. New York State J. Med. 45, 17:1875 (Sept. 1), 1945.

Workers Who Get Sick—Rates for digestive and non-respiratory-non-digestive diseases continue to rise, both rates for 1945 (first quarter) having never been equalled or exceeded during the past ten years. There was less influenza.

GAFAFER, W. M. Sickness Absenteeism among Male and Female Industrial Workers during 1944 and among Males during the First Quarter of 1945 with a Note on Absence Duration 1941–1944. Pub. Health Rep. 60, 36:1037 (Sept. 7), 1945.

Road to Perdition—For three years this Georgia county has had a prepaid plan for medical care at a cost of $50 per family. The claim is made that it is good for the doctors as well as the beneficiaries. Though it may be berated by some as "socialized medicine," to those who participate in it, it is regarded as plain horse sense, says the writer. In New Mexico another experiment is based on medical services through three clinics—and *that* seems to be working, too.

GLOVER, K. Better Health for Country Folks (and) HARDING, T. S. In the Mountains of New Mexico. Survey Graphic. 34, 9:372 (Sept.), 1945.

Susceptibility of New-born to Pertussis—In this study a group of mothers were given pertussis vaccine during the last months of pregnancy, another group served as controls. Placental transfer of pertussis antibodies was found to occur, and further, that the higher the level in the mother, the more nearly does the titer of the baby approach her own.

KENDRICK, P., *et al.* Immunity Response to Mothers and Babies to Injections of Pertussis Vaccine During Pregnancy. Am. J. Dis. Child. 70, 1:25 (July), 1945.

Pilot Study on Fluorides—About 300 children received topical applications of sodium fluoride to the teeth on the left side of the mouth, a comparable group received no treatment. Initial caries attacks continued for two years to be 40 per cent less for the treated than on the untreated side of the children's mouths.

KNUTSON, J. W., and ARMSTRONG, W. D. The Effect of Topically Applied Sodium Fluoride on Dental Caries Experience. II. Report of Findings for Second Study Year. Pub. Health Rep. 60, 37:1085 (Sept. 14), 1945.

One for the Record—In smaller doses than American practice has set, British-made whooping cough vaccine was found to have no protective value in one Oxford (England) study.

MCFARLAN, A. M., *et al.* Trial of Whooping-Cough Vaccine in City and Residential Nursery Group. Brit. M. J. 4415:205 (Aug. 18), 1945.

Sanitation in the Raw—Clearing debris, disposing of refuse and corpses, supplying potable water, controlling prostitutes were just a few of the tough sanitary and medical jobs encountered after the liberation of Caen—pronounced "Kah," remember? It is to be hoped that our returning medical

majors will have equally entertaining and revealing stories to tell.

RAISTRICK, S. F. Medical Problems of the Rehabilitation of Caen. Public Health. 58, 12:135 (Sept.), 1945.

And What Price Contentment?—Not the costliness, but the actual economy of good housing in social, as well as financial dividends, is argued in this stimulating paper. Infant mortality, tuberculosis, diseases of childhood, home accidents, delinquency rates are all measurable in evaluating profits is the claim.

RUMNEY, J., and SHUMAN, S. Social Dividends from Public Housing. Survey. 81, 9:223 (Sept.), 1945.

For Diagnosis Only—Here you will find the low-down on the day-to-day details of running a cancer detection clinic. In this one, 176 men and 743 women have been examined in the course of five months. What happened in response to the examinations is recounted.

SCHRAM, M. W. S. The Organization and Results of Health Maintenance-Cancer Prevention Clinics. J.A.M.A. 129, 4:275 (Sept. 22), 1945.

Dental Care for Americans—There are 70 thousand American dentists and 24 million children who will demand the services of 25 thousand dentists to give essential care. The remaining 45 thousand dentists are left to do the job for the rest of us—a ratio of 1 to 2,000! Solutions for this poser are offered.

STRUSSER, H. Dental Problems in Postwar Planning. J. Am. Dent. A. 32, 15:991 (Aug. 1), 1945.

"His Sisters and His Cousins and His Aunts"—One technic for conducting the first post-partum visit is described. All persons interested in the infant including household employees and relatives, but particularly the father, are included in the instructions which are thorough.

TOMPKINS, C. A. Preventive Care of Infants and Children. Am. J. Dis. Child. 70, 1:32 (July), 1945.

Can Germs Be Wafted Away?—School ventilation standards of 30 cu. ft. per minute per child are hard to attain and do not prevent the spread of classroom infections. Radiant disinfection of the air does a better job.

WELLS, M. W. Ventilation in the Spread of Chicken Pox and Measles Within School Rooms. J.A.M.A. 129, 3:196 (Sept. 15), 1945.

To Replace Assembly-line Once-overs—Health guidance rather than wholesale medical inspections is a significant trend, this writer asserts. I hope he's right! And if he is, then this paper has a claim to your eyes and mind, whatever your health job may be. There are also a baker's dozen of related papers on school health that cannot be listed here.

WILSON, C. C. Health Counseling in Schools. Pub. Health Nurs. 37, 9:436 (Sept.), 1945.

BOOKS RECEIVED

Listing in this column acknowledges the receipt of books and our appreciation to the senders. Space and the interests of readers will permit review of some, but not all, of the books listed in future issues.

THE ART AND SCIENCE OF NURSING. By Ella L. Rothweiler, R.N., and Jean Martin White, R.N. 3rd ed. Philadelphia: Davis, 1945. 793 pp. 145 illus. Price, $5.00.

THE ART OF HOME NURSING. Simple Technics and Practical Procedures. By Betty Quinn Wagner, R.N. Philadelphia: Davis, 1945. 314 pp., illus. Price, $2.00.

THE ART OF MEDICINE IN RELATION TO THE PROGRESS OF THOUGHT. A Lecture in the History of Science Course in the University of Cambridge, February 10, 1945. By A. E. Clark-Kennedy, M.D. New York: Macmillan, 1945. 48 pp. Price, $.75.

THE CLASSIFICATION AND TREATMENT OF INJURIES TO THE TEETH OF CHILDREN. A Reference Manual for the Dental Student and the General Practitioner. By Roy Gilmore Ellis, D.D.S. Chicago: Year Book Publishers, 1945. 248 pp. Price, $2.75.

DIETOTHERAPY. CLINICAL APPLICATION OF MODERN NUTRITION. Edited by Michael G. Wohl, M.D. Philadelphia: Saunders, 1945. 1029 pp. 93 illus. Price, $10.00.

FUNDAMENTALS OF PHARMACOLOGY. By Clinton H. Thienes, M.D. New York: Hoeber, 1945. 497 pp. Price, $5.75.

HAHNEMANN: THE ADVENTUROUS CAREER OF A MEDICAL REBEL. By Martin Gumpert. New York: L. B. Fischer, 1945. 251 pp. Price, $3.00.

HANDBOOK OF INDUSTRIAL PSYCHOLOGY. By Dr. May Smith. New York: Philosophical Library, 1944. 304 pp. Price, $5.00.

HEALTH INSTRUCTION YEARBOOK, 1945. Compiled by Oliver E. Byrd. Stanford: Stanford University Press, 1945. 344 pp. Price, $3.00.

HERE'S HOW IT'S DONE. A POPULAR EDUCATION GUIDE. By Florence B. Widutis. New York: The Postwar Information Exchange, 1945. 74 pp. Price, $1.00.

HIDDEN HUNGER. By Icie G. Macy, Ph.D., and Harold H. Williams, Ph.D. Lancaster: Jacques Cattell Press, 1945. 286 pp. Price, $3.00.

HOW A BABY GROWS. A STORY IN PICTURES. By Arnold Gesell, M.D. New York: Harper, 1945. 78 pp. Price, $2.00.

HYGIENE. By J. R. Currie, M.D., and A. G. Mearns, M.D. 2nd ed. Baltimore: Williams & Wilkins, 1945. 432 pp., illus. Price, $6.00.

LARGE SCALE RORSCHACH TECHNIQUES. A MANUAL FOR THE GROUP RORSCHACH AND MULTIPLE CHOICE TEST. By M. R. Harrower-Erickson, Ph.D., and M. E. Steiner, M.A. Springfield, Ill.: Thomas, 1945. 420 pp. 70 illus. Price, $8.50.

LIFE AND HEALTH. By Charles C. Wilson, M.D., John L. Bracken, M.A., and John C. Almack, Ph.D. Indianapolis: Bobbs-Merrill, 1945. 557 pp., illus. Price, $2.12.

THE LOCAL HOUSING AUTHORITY AND THE ARCHITECT. By Oliver C. Winston. Chicago: Public Administration Service, 1945. 16 pp. Price, $.60.

MEDICAL NURSING. By Edgar Hull, M.D., and Cecilia M. Perrodin, R.N. 3rd ed. Philadelphia: Davis, 1945. 641 pp. 152 illus. Price, $3.50.

MENTAL HYGIENE. THE PSYCHOLOGY OF PERSONAL ADJUSTMENT. By D. B. Klein. New York: Holt, 1944. 498 pp. Price, $2.80.

MICROBES OF MERIT. By Otto Rahn. Lancaster: Jaques Cattell Press, 1945. 277 pp. Price, $4.00.

NEW DIRECTIONS IN PSYCHOLOGY. Toward Individual Happiness and Social Progress. By Samuel Lowy, M.D. New York: Emerson Books, 1945. 194 pp. Price, $3.00.

THE NURSE AND THE LAW. By Gene Harrison, R.N. Philadelphia: Davis, 1945. 353 pp. Price, $3.00.

OBSTETRIC MANAGEMENT AND NURSING. By Henry L. Woodward, M.D., and Bernice Gardner, R.N. 3rd ed. Philadelphia: Davis, 1945. 828 pp. 373 illus. Price, $3.50.

OUR AMERICAN BABIES. THE ART OF BABY CARE. By Dorothy V. Whipple, M.D. New York: M. Barrows & Co., 1944. 367 pp. Price, $2.50.

PEDIATRIC NURSING. By Abraham Levinson, M.D. 3rd ed. Philadelphia: Lea & Febiger, 1945. 299 pp. Illus. Price, $3.00.

PRINCIPLES OF PEDIATRICS AND PEDIATRIC NURSING. By Cecilia M. Knox, R.N. Philadelphia: Davis, 1945. 527 pp. Illus. Price, $3.50.

PSYCHOLOGY. PRINCIPLES AND APPLICATIONS. By T. L. Engle, Ph.D. Yonkers: World Book Co., 1945. 549 pp. Price, $2.12.

PULMONARY TUBERCULOSIS. A HANDBOOK FOR STUDENTS AND PRACTITIONERS. By R. Y. Keers, M.D., and B. G. Rigden. Baltimore: Williams & Wilkins, 1945. 273 pp., illus. Price, $5.00.

A SOCIAL SURVEY OF HEALTH AND ILLNESS IN URBAN FAMILIES. By Paul B. Gillen under the auspices of the Kips Bay-Yorkville District Health Committee and the Department of Public Health and Preventive Medicine of the Cornell University Medical College. New York: Cornell University Medical College, 1945. 55 pp. Price, $1.00.

TAKE IT EASY. THE ART OF CONQUERING YOUR NERVES. By Arthur Guy Mathews. New York: Sheridan House, 1945. 238 pp. Price, $2.98.

TEXTBOOK OF OBSTETRICS. Designed for the Use of Students and Practitioners. By Henricus J. Stander, M.D. 3rd ed. New York: Appleton-Century, 1945. 1287 pp. 973 illus. Price, $10.00.

TUBERCULOSIS IN THE UNITED STATES. GRAPHIC PRESENTATION. Vol. 3. Mortality Statistics for Cities of 100,000 or More Population by Age, Sex and Race, 1939–1941. Prepared by the Staff of the Field Studies Section of the Tuberculosis Control Division, U. S. Public Health Service under the direction of Carroll E. Palmer, M.D. New York: National Tuberculosis Assn., 1945. 194 pp. Free from Dr. Carroll E. Palmer, National Institute of Health, Bethesda 14, Md.

UNDERSTANDING OURSELVES. A DISCUSSION OF SOCIAL HYGIENE FOR OLDER BOYS AND GIRLS. By Marion L. Faegre. Minneapolis: University of Minnesota Press, 1944. 44 pp., illus. Price, $.50.

WHAT PEOPLE ARE. A STUDY OF NORMAL YOUNG MEN. By Clark W. Heath. Cambridge: Harvard University Press, 1945. 141 pp. Price, $2.00.

WOMEN PHYSICIANS. THE OUTLOOK FOR WOMEN IN OCCUPATIONS IN THE MEDICAL SERVICES. Women's Bureau, U. S. Department of Labor. Washington, D. C.: U. S. Gov. Ptg. Off., 1945. Bulletin 203, No. 7. 28 pp. Price, $.10.

X-RAY TECHNICIANS. THE OUTLOOK FOR WOMEN IN OCCUPATIONS IN THE MEDICAL SERVICES. Women's Bureau, U. S. Department of Labor. Washington, D. C.: U. S. Gov. Ptg. Off., 1945. Bulletin 203, No. 8. 14 pp. Price, $.10.

NEGRO WOMEN WAR WORKERS. Women's Bureau, U. S. Department of Labor. Washington, D. C.: U. S. Gov. Ptg. Off., 1945. Bulletin 205. 23 pp. Price, $.10.

WORKING WITH NEWSPAPERS. By Gertrude W. Simpson. New York: National Publicity Council, 1945. 32 pp. Price, $.75.

A COMPARATIVE STUDY OF SAMPLING DEVICES FOR AIR-BORNE MICRO-ORGANISMS. By H. G. duBuy, Alexander Hollaender and Mary D. Lackey. Supplement No. 184 to the Public Health Reports. Washington, D. C.: U. S. Gov. Ptg. Off., 1945. 40 pp. Price, $.05.

SOME ECONOMIC ASPECTS OF ALCOHOLIC PROBLEMS. Memoirs of the Section on Alcohol Studies, Yale University, No. 4. By Benson Y. Landis, Ph.D. New Haven: Quarterly Journal of Studies on Alcohol, 1945. 44 pp. Price, $.50.

ASSOCIATION NEWS

APPLICANTS FOR MEMBERSHIP

The following individuals have applied for membership in the Association. They have requested affiliation with the sections indicated.

Health Officers Section

Agnes W. Black, M.B., D.P.H., 4712 W. 6 Ave., Vancouver, B. C., Can., Medical Health Officer, Metropolitan Health Committee

Moses J. Entin, M.D., 6210 Spencer Ave., New York 63, N. Y., Asst. Surgeon (R), U. S. Public Health Service

Joe M. Funderburk, M.D., Arcadia, La., Director, Bienville Parish Health Unit

Francis E. Hillman, M.D., 6508 Moore Drive, Los Angeles 36, Calif., Public Health Physician, Los Angeles County Health Dept.

Roger A. Kennedy, D.P.H., City Hall, St. Thomas, Ontario, Can., Senior Medical Officer of Health, Elgin-St. Thomas Health Unit

Nicolai N. Rilcoff, M.D., 1830 Flower St., Bakersfield, Calif., Kern County Director of Public Health

Laboratory Section

Federico Chavez R., M.D., 805 E. Huron St., Ann Arbor, Mich., Jefe de la Secc. Antirrabica del Instituto Bacteriologico de Chile

Frederick W. LaCava, Ph.D., Box 97, Hopemont, W. Va., Director of Laboratories, Hopemont Sanitarium

Z. Lois Peterson, 521 Oak St., Grand Forks, N. D., Bacteriologist, Div. of Labs., State Health Dept.

Arlan G. Roberts, 143 E. Court, Dayton 3, O., NCO in Charge of Sanitation, Patterson Field, AUS

Ralph H. Tash, 1396 Peachtree St., N.E., Atlanta, Ga., Bacteriologist, Veterinary Div., State Dept. of Agriculture

Stanley J. Thomas, Ph.D., Lehigh Univ. Dept. of Biology, Bethlehem, Pa., Head, Dept. of Biology

Vital Statistics Section

Constance W. Altshuler, M.S.P.H., 107 Waverly Pl., New York 11, N. Y., Medical Statistician, National Foundation for Infantile Paralysis

Nancy J. Brombacher, National Institute of Health, Bethesda 14, Md., Junior Statistician, U. S. Public Health Service

Thomas P. Lesesne, 3307 Murray St., Columbia 55, S. C., Chief Clerk, Div. of Vital Statistics, State Board of Health

Mary I. Lorenz, State Dept. of Health, Oklahoma City, Okla., Junior Statistician

Sophie Rakesky, M.S., W. K. Kellogg Foundation, Battle Creek, Mich., Statistician

Engineering Section

Henry R. Karmasin, 3529 N. Keating Ave., Chicago, Ill., Sanitarian, Evanston Health Dept.

Henry B. Nabers, C.E., 602 Broad St., Wichita Falls, Tex., Public Health Engineer, Wichita City-County Health Unit

Industrial Hygiene Section

Edison de Freitas Teixeira, M.D., M.P.H., Dept. de Saude, Seccao de Higienedo Trabalho, Sao Paulo, Brazil, S. A., Asst. Health Officer, State of Sao Paulo

Haven L. Williams, 327 Central Trust Bldg., Altoona, Pa., District Industrial Hygiene Engineer, State Dept. of Health

Food and Nutrition Section

J. Newlin Embree, 350 Madison Ave., New York 17, N. Y., Mgr., Vitamin Div., Borden Co.

Elizabeth W. Jukes, M.S., 709 W. Kalamazoo, Lansing 15, Mich., Nutrition Consultant, State Dept. of Health

Public Health Education Section

Karl Bleyl, Ph.D., 412 W. Willow, Normal, Ill., Asst. Prof. of Bio-Science, Illinois State Normal Univ.

Margaret E. Jones, D.D.S., M.P.H., 1824 Geddes Ave., Ann Arbor, Mich., Health Educator, Mott Foundation, Flint, Mich.

Consuelo Rodriguez, Box 372, Manati, P. R., Medical Social Worker, Health Dept.

Dorothy C. Tipple, R.N., North St., West Winfield, N. Y., Nurse Teacher, West Winfield Central School

Hannah M. Turnage, M.S., State Board of Health, Raleigh, N. C., Health Educator, School Health Coordinating Service, State Board of Health and Dept. of Public Instruction

Glen W. Tuttle, M.D., D.T.M., A.B.F.M.S., Sona Bata, via Matadi, Belgian Congo, Africa, Principal, School of Nursing, Ecole Protestantes des Auxilaires Medicaux au Congo

Harriett M. Williams, 326 Locust St., Akron, O., Social Worker, Summit County Tuberculosis Assn.

Public Health Nursing Section

Gertrude J. Davis, 1317 W. 20 St., Little Rock, Ark., Case-finding and Health Education, County Tuberculosis Assn.

Harriet H. Foster, R.N., 1241 De Siard, Monroe, La., Staff Nurse, State Dept. of Public Health

Elizabeth Reed, R.N., 980 Main St., Jacksonville 2, Fla., Director, Jacksonville Visiting Nurse Assn.

Ruth E. Rives, M.A., 3 Mason St., Glens Falls, N. Y., District State Supervising Nurse, State Dept. of Health

Norma F. Whiteside, 816 Oregon Bldg., Portland 4, Ore., Senior Asst. Nurse Officer (R), U. S. Public Health Service

Epidemiology Section

John M. Chapman, M.D., M.P.H., 425 Lamarck Drive, Buffalo 21, N. Y., Asst. District Health Officer, State Dept. of Health

Laurence J. Charles, D.T.M., M.P.H., Malaria Control Unit, St. Lucia, B.W.I., Malariologist, Leeward-Windward Isles

Merl G. Colvin, M.D., R.D. 2, Williamsport, Pa., Health Officer

James P. Conway, M.D., 4309 N. Prospect Ave., Milwaukee 11, Wisc., Epidemiologist, U. S. Navy

William Wen-ming Li, M.D., 1 Hsiao-si-Lu, Lanchow, Kansu, China, Director, Dept. of Epidemiology, National Northwest Institute of Health

School Health Section

Ross L. Allen, Dr.P.H., 40 N. Church St., Cortland, N. Y., Prof. of Health Education, New York State Teachers College

Marion Fenner, R.N., 23 E. Pueblo, Santa Barbara, Calif., School Nurse, Santa Barbara City Schools, Health Dept.

Hermina A. Hartig, M.D., 2901 Vincent Ave., N., Minneapolis 11, Minn., Chief School Physician, Minneapolis Public Schools, Board of Education

Raymond F. Lenart, M.A., 210 S. St. Clair St., Painesville, O., Student, Univ. of Michigan

Dental Health Section

Benjamin F. Gunter, D.D.S., 400 W. Hill Ave., Knoxville, Tenn., Dental Officer, State Dept. of Public Health

Unaffiliated

Hallie I. Morgan, M.D., M.P.H., 217 Observatory St., Ann Arbor, Mich., Research Asst. in Economics, School of Public Health, Univ. of Michigan

Paul A. Scott, M.D., C.M., 5½ McKenzie Crescent, Toronto, Ontario, Can., Student, School of Hygiene, Univ. of Toronto

DECEASED MEMBERS

Craig Barrow, M.D., Savanah, Ga., Elected Member 1926, Public Health Education Section

Robert E. Perdue, M.D., Norwalk, Conn., Elected Member 1940, Health Officers Section

Jose M. Santiago, M.D., Vega Baja, Puerto Rico, Elected Member 1944, Health Officers Section

Francisco Sein, M.D., Laras, Puerto Rico, Elected Member 1944, Health Officers Section

Smith L. Turner, M.D., Williston, Fla., Elected Member 1945, Health Officers Section

EMPLOYMENT SERVICE

The Association Employment Service seeks to bring to the attention of appointing officers the names of qualified public health personnel and to act as a clearinghouse on employment. This is a service of the Association conducted without expense to the employer or employee.

From the registry of persons available, selected announcements are published from time to time. Appointing officers may obtain lists of all registrants on request.

Address all correspondence to the Employment Service, American Public Health Association, 1790 Broadway, New York 19, N. Y.

Positions Available

(Supplemental to lists in recent Journals)

Wanted: Two full-time physicians, immediate appointment. Conduct small venereal disease clinics on rotating schedule. Beginning salary $3,600 plus travel. Salary range $3,600 to $4,800 with $300 semiannual increases depending upon performance and availability of funds. Appointments limited graduates United States and Canadian Class A Medical Schools eligible licensure New Mexico. Physicians under 50 years with v.d. experience preferred. Address Director, State Health Dept., Box 711, Santa Fe, N. M.

Wanted: Medical officers for positions. Director of preventable diseases, director of maternal and child health, district health officers; excellent opportunities for right men. Salary to start $4,500 year and travel expense. Positions permanent. Write G. F. Campana, M.D., State Health Officer, Bismarck, N. D.

Wanted: Health education secretary by tuberculosis association in large western city. Emphasis on community and school program plus publicity. Attractive position open in agency with dynamic program closely related to official groups. Write **Box DS**, Employment Service, A.P.H.A.

Industrial Hygiene Engineer position available with Oregon State Board of Health. $275–$325 per month. Requires B.A. in chemical engineering, 2 years as industrial hygiene engineer in government agency and 1 year graduate work in chemical engineering or industrial hygiene (or additional 2 years' experience). Write Merit System Council, 616 Mead Bldg., Portland 4, Ore.

Wanted: Technical Service & Development positions open with company established in specialized industrial chemical fields. Permanent positions with attractive future for young men, age 22–32, with Bachelor's degree in chemistry or chemical engineering. Previous experience in food processing desirable but not essential. Write complete details to **Box CE**, Employment Service, A.P.H.A.

Health Education Worker, vicinity New York City, to conduct a joint health education program for an official and nonofficial agency. Salary approximately $2,500, 5½ day week, 5 days in summer, with one month vacation. Degree in health education preferred but will consider applicants with experience in public health. Write **Box SI**, Employment Service, A.P.H.A.

Wanted Immediately: Two industrial hygiene medical consultants (physicians) for permanent positions with State Dept. of Health. Salary from $440 to $525 per month plus $20 cost of living bonus, with travel allowance up to $6 per diem while in field. Training and experience in industrial hygiene desirable. Apply Arthur L. Ringle, M.D., Director, State Dept. of Health, Seattle, Wash.

Wanted: Full-time health officer. If interested address George A. Tierney, 164 Court St., Middletown, Conn., stating age, qualifications and minimum salary expected.

Executive Secretary Wanted: For Columbia Co. Tuberculosis Eradication Association. Applicant must have specialized training in health education. Car furnished. Apply with full information to Rev. S. F. Olszewski, 426 Warren St., Hudson, N. C.

Wanted: Public Health Nurses in Hawaii Bureau of Public Health Nursing, Board of Health, Territory of Hawaii, has urgent need of staff nurses. Salary starts at $192.50 plus $45 bonus for nurses with a one-year accredited course in public health nursing and one year of successful experience. Maximum for this position $237.50. Write to Board of Health, Honolulu, T. H. Use clipper mail (15¢).

POSITIONS WANTED

Toxicologist, formerly with CWS, desires position in northeastern states, preferably New York. Was director of laboratory consisting of bacteriologists, biologists, chemists, and aides. Experience further includes sanitation field, waste disposal, boiler and water treatment. Would also consider research and teaching arrangement at a university to finish one year graduate study needed toward Ph.D. degree. Age 32. **E-484**

Well established woman physician with M.P.H. from Harvard and 5 years' experience as county health officer, will consider a position in the field of communicable disease control at a salary of $5,000 or better. **A-516**

Medical Entomologist, age 32, Ph.D. in entomology Cornell University, wishes teaching position with a medical school or university. Would also be interested in malaria and/or mosquito control work. Over 3 years in Sanitary Corps, U. S. Army. Co-author of textbook on identification and habits of mosquitoes now in press. Sigma Xi. Excellent references. **E-485**

Bacteriologist-Immunologist; A.B. degree plus graduate work; public health and teaching experience. Excellent references. **L-475**

Laboratory technician, B.S. in biology, wishes position preferably in metropolitan area though not essential. Experienced in chemistry and bacteriology, 2 years with Public Health Service and City Health Department. Knows analysis and media room direction. Just completed course in x-ray with Public Health Service. **L-477**

Opportunities Available

Advertisement

WANTED—(a) Health commissioner; well trained in public health administration; progressive program; Southeast. (b) Venereal disease control officer; county health department; headquarters in town of 80,000 located approximately midway between Los Angeles and San Francisco. (c) Medical director of crippled children's program; pediatrician with public health experience or training preferred; department responsible for providing medical and surgical care of approximately 5,000 children; well staffed department, rapidly growing; permanent headquarters in university medical center; Middle West. (d) Student health physician; co-educational college; duties consist principally of office consultation, examinations, treatment of students; occasional hygiene lectures; advantageous if particularly well qualified or interested in internal medicine; noted health resort located in Rocky Mountain area. (e) Public health director for county of 80,000; minimum $6,500; Middle West. (f) Young woman physician for student health appointment; competent medical clinician interested in student health work as career required; duties include responsibilities for preventive and acute medicine as well as for hygiene and public health lecturing. **PH11-1** The Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago 11.

WANTED—(a) Health educator; municipal tuberculosis association having active tuberculosis program under way; must be qualified to present to general public some of major tuberculosis programs as well as basic information on community aspects of tuberculosis work; duties would include some work with the public schools; interesting opportunity; West. (b) Health coordinator; must be well trained in medical sciences, public health and education; duties include visiting communities throughout state and directing experimental centers in school health, guiding school and health personnel in developing school health programs, participating on faculty of university; Middle West. (c) Public health nurse; generalized program, county of approximately 30,000; Pacific Northwest. (d) Public health supervisor; cancer service, county health program; preferably some one skilled not only in care of patients but qualified also to present educational side of cancer program; organization works closely with health organizations in three major cities and with several hospitals conducting cancer clinics; East. (e) Public health nurse; state tuberculosis association; duties include traveling with mobile unit; $185–190, traveling expenses; Middle West. (f) Several nurses for industrial dispensary; large industrial company; $200; South. **PH11-2** The Medical Bureau, Burneice Larson, Director, Palmolive Building, Chicago 11.

WANTED—(a) Bacteriologist; preferably some one with about three years' experience in public health bacteriology; state owned hospital specializing in tuberculosis work; $230 with rapid increases; Middle West. **PH11-3**

Opportunities Wanted

Advertisement

HEALTH EDUCATOR; B.S., M.S., and Ph.D. degrees; several years, instructor in biology, bacteriology and health; state university; three years, public health educator, city and county health department; for further information please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

YOUNG PHYSICIAN expecting early discharge from Navy; A.B., M.D. degrees eastern schools; upon entering Navy directly from internship, completed course in epidemiology; nearly three years' field experience in epidemiology, preventive medicine, tropical medicine and sanitation, including eighteen months in Central Pacific area of Operations; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

BACTERIOLOGIST; A.B., M.A., Ph.D. degrees; several years' successful teaching and research experience in general, dairy and food bacteriology; past several years, director, bacteriological department, metropolitan department of public health; for further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago 11.

DENTIST who has specialized in public health; D.D.S., university medical school; several years' private practice; year of postgraduate training in public health hygiene with special emphasis on public health dentistry for which he received degree of M.S.P.H.; several years, state department of health; for further information, please write Burneice Larson, Director, Medical Bureau, Palmolive Building, Chicago 11.

HEALTH EDUCATOR; M.S. in public health; three years, director health education; county health department; for further information, please write Burneice Larson, Director, The Medical Bureau, Palmolive Building, Chicago 11.

NEWS FROM THE FIELD

NEW SOCIAL HYGIENE LAWS IN 1945

At least 26 of the 44 state legislatures having regular sessions in 1945 considered social hygiene legislation. The results in summary are shown in the maps and notes below.

Premarital Examination Laws

Out of 17 states considering such bills, two states—**Florida** and **Oklahoma**—and also the **Territory of Hawaii**, adopted premarital examination laws; and laws were amended in **Maine, Michigan, North Carolina, Pennsylvania, West Virginia**, and **Utah.** Thirty-two states and the Territory of Hawaii now protect marriage from syphilis by requiring examinations of both bride and groom, including a blood test for syphilis.

32 states and Hawaii — Require blood tests for syphilis of both bride and groom before issuing marriage license

3 states — Require examination by physician for venereal diseases, or medical certificate showing freedom from such diseases, usually of grooms only

1 state — Prohibits marriage of persons infected with venereal diseases, or requires personal affidavit of freedom from such diseases, but no examination specified

12 states and the District of Columbia — Grant marriage licenses without regard to venereal disease infection

Prenatal Examination Laws

Ten states considered bills and five—**Arizona, Florida, Montana, Ohio** and **West Virginia**—adopted new laws. Amendments to the existing laws were passed in **Maine** and **Oklahoma.** Babies are now protected from syphilis by blood tests of expectant mothers in 35 states, and the **Territory of Hawaii.**

35 states and Hawaii — Require prenatal blood tests for syphilis

13 states and the District of Columbia — Do not require prenatal blood tests for syphilis

(Maps by the American Social Hygiene Association as of September 1, 1945.)

Social Hygiene News, 20, 9 (Sept.), 1945

EYE-BANK COUNCIL

The Eye-Bank for Sight Restoration, Inc., 210 East 64th Street, New York 21, N. Y., has announced the appointment of a National Eye-Bank Council made up of 75 leaders in the fields of medicine, finance and business, who will serve as members of a council for the Eye-Bank. The Council's Chairman is Albert G. Milbank of New York City. The Council will aid in the plan to establish a nation-wide eye-bank for obtaining and making available healthy corneal tissue to restore the vision of persons whose sight has been lost through affections of the cornea. The plan which the Council is sponsoring includes research, study, and instruction of ophthalmologists in the surgical technics required in performing the corneal graft operation. Fellowships which will enable advanced study in causes of corneal infections, and in methods to increase the time which corneal tissue may be preserved and made available for use in sight restoration operations, are also included in the plan.

Similar to the function of blood banks in restoring exhausted blood supply, the Eye-Bank was organized to make possible restoration of the sight of persons whose vision has been destroyed because of corneal affections by replacement with healthy tissue from the eyes of other persons. Of the 250,000 persons in the United States who are presently blind, it is estimated, according to the Council, that the sight of 5 to 7 per cent has been lost through opaque corneas, and that the vision of approximately 10,000 of those so affected might be restored if healthy corneal tissue were available for the corneal graft operation. It is the purpose of the Eye-Bank to locate, obtain, and have accessible wherever and whenever needed the corneal tissue. This capital stock of the Eye-Bank may be obtained only from persons whose sight requires the removal of an eye whose corneal tissue is unimpaired, or by obtaining the healthy eyes of persons immediately after death.

Inasmuch as the effectiveness and serviceability of the Eye-Bank depend upon the immediate availability of corneal tissue which must be taken from human eyes, it is necessary and important to educate both professional and lay groups in coöperating to make possible this latent procedure.

Under guidance of the Council, a movement has been launched to procure eyes removed from those whose corneal tissue is not affected, and also the eyes of persons of unimpaired vision immediately after death. At present, it is possible to preserve corneal tissue for utilization in the delicate graft operation for only 72 hours; therefore it is necessary to arrange for the speedy collection and preservation of eyes immediately upon removal. Such a plan is already in limited operation among representative eye hospitals and surgeons in New York and several other cities, and it is part of the Eye-Bank plan to expand this activity to include such institutions and the profession throughout the United States.

DRS. DUBLIN AND BAUMGARTNER RETURN FROM FRENCH MISSION

Dr. Louis I. Dublin, Second Vice President and Statistician of the Metropolitan Life Insurance Company and Assistant to the Chairman of the American Red Cross, left late in August for a Red Cross mission to France. He was accompanied by Leona Baumgartner, M.D., Ph.D., Director of the Bureau of Child Hygiene in the New York City Department of Health and Associate Editor of the *American Journal of Public Health*.

According to the announcement, the privations of war and the evils of Nazi military occupation have left their stamp on the health of the French people. Particularly serious has been

the damage done to the health of the children, among whom malnutrition, tuberculosis, diphtheria, and other diseases have taken a heavy toll. In fact, the problem of child health is so urgent and of such magnitude that the French Government has called upon the American Red Cross for assistance. This organization was requested to send representatives to study the situation at first hand and to make recommendations as to the part that the American Red Cross may play in a coördinated plan of relief for the children, in which the French Government as well as other interested agencies would participate.

MAJOR GENERAL GEORGE C. DUNHAM RETIRES

Major General George C. Dunham, M.C., U. S. Army, who has been serving as President of the Institute of Inter-American Affairs, Washington, has resigned as of August 30 for health reasons. Dr. Dunham will be retired from active duty in the Army as of October 31. His address will continue to be in care of the Institute of Inter-American Affairs, Washington.

General Dunham is a graduate in medicine of the University of Oregon in 1914, and received a doctorate in public health from Johns Hopkins School of Hygiene and Public Health in 1921. He is the author of the volume *Military Preventive Medicine*, which has appeared in three editions. General Dunham is known internationally for his service, especially in recent years, supervising the work done in health and sanitation in Central and South America under the auspices of the Coördinator of Inter-American Affairs and of the Institute.

COLONEL GOTAAS ELECTED PRESIDENT INSTITUTE OF INTER-AMERICAN AFFAIRS

Colonel Harold B. Gotaas, Sn.C., U. S. Army, has been elected President of the Institute of Inter-American Affairs, Washington, succeeding Major General George C. Dunham, U.S.A., who has retired on account of health and has assumed the chairmanship of the Board of Directors of the Institute. Colonel Gotaas is a native of South Dakota and has received degrees in civil engineering at the University of South Dakota and Iowa State College. He holds the doctorate in sanitary and public health engineering from Harvard University. Prior to his service in the Army, Colonel Gotaas was Professor of Public Health Engineering at the University of North Carolina. He holds decorations from the governments of Chile and Bolivia for his help in sanitation work which he has carried on as director of the Institute's Health and Sanitation Division.

Colonel Gotaas's successor as director of the Health and Sanitation Division is Colonel John Yeagley.

DR. WARREN F. DRAPER DECORATED, RETURNS TO UNITED STATES

Major General Warren F. Draper, M.C., U. S. Army, has returned to the United States and as of October 1 resumed his position as Deputy Surgeon General, U. S. Public Health Service, Bethesda, Md. General Draper served as a member of General Eisenhower's staff from May 1, 1944, to June 1, 1945, as Chief of the Public Health Branch and chief public health adviser at Supreme Headquarters, Allied Expeditionary Forces.

Dr. Draper was recently made an Honorary Companion of the Bath by order of His Majesty, King George of England, the presentation having been made at a ceremony in London by Field Marshall Sir Arthur Tedder.

The Distinguished Service Medal has been awarded to Dr. Draper, who "served with conspicuous distinction as Chief of the Public Health Branch. . . . He directed the formulation and

execution of the Supreme Commander's policies governing public health in liberated nations and conquered territories. Drawing on his many years' experience, he coördinated all resources for the prevention and control of civilian epidemics which might have interfered with military operations, and successfully met tremendous problems caused by the chaotic conditions left by the war in many areas. The plans and procedures drawn up by General Draper were successful in every test. Through controlling disease in Europe, he contributed to the highest degree to the success of the Allied forces."

BRONZE STAR MEDAL TO LOUIS L. FELDMAN

Louis L. Feldman, First Lieutenant, Medical Administrative Corps, Medical Section, Allied Force Headquarters, was awarded the Bronze Star Medal "for meritorious achievement in connection with military operations . . . as Medical Statistician and Records Officer for the Surgeon, Mediterranean Theater of Operations . . . Lieutenant Feldman's executive ability, thorough command of statistical methods, and painstaking accuracy rendered his performance of duty an outstanding contribution to the successful accomplishment of the Army Medical Department's mission." Lieutenant Feldman was formerly a member of the A.P.H.A. staff, is on leave from the New York State Department of Health, and is assigned to the Office of the Surgeon General, U. S. Army.

UNRRA APPOINTS CHIEF NURSE OF THE HEALTH DIVISION

The United Nations Relief and Rehabilitation Administration has announced the appointment of Lillian J. Johnston, R.N., as Chief Nurse in the Health Division. She recently has been serving as Acting Chief Nurse. Miss Johnston was graduated from the Hartford Training School for Nurses and from Teachers College, Columbia University, New York. She began her work as a Senior Public Health Nurse with the Office of Foreign Relief and Rehabilitation Administration in December, 1943.

MACY FOUNDATION RECEIVES ADDITIONAL FUNDS FOR HEALTH STUDIES

The Josiah Macy, Jr., Foundation of New York City has been made residuary legatee for the estate of Mrs. Kate Macy Ladd of New Jersey, who died August 27. Mrs. Ladd was the founder of the Macy Foundation and has made other funds available, including two and one-half million dollars, of which the income will be used "to initiate, stimulate, develop, and support scientific investigations of the fundamental aspects of health, sickness, and the relief of suffering."

DR. BRYAN APPOINTED DEPUTY DIRECTOR OF HEALTH FOR UNRRA

Herbert H. Lehman, Director General of the United Nations Relief and Rehabilitation Administration, Washington, has announced that Dr. A. Hughes Bryan, an officer of the U. S. Public Health Service who has been serving with UNRRA since July, 1944, has been appointed Deputy Director of Health of UNRRA succeeding James A. Crabtree, M.D., Medical Director, U. S. Public Health Service.

Dr. Bryan is a graduate in medicine from Harvard and was formerly assistant professor in the Department of Medicine, University of Chicago. Dr. Crabtree has returned to his duties with the Public Health Service in which he has served since 1938. He is a graduate of the University of Tennessee School of Medicine and served for years with the State Department of Health in Tennessee and with the Tennessee Valley Authority. He has

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been with UNRRA since its inception and has served both as Acting Director and Deputy Director of Health.

COLONEL HENNESSY RECEIVES BRONZE STAR MEDAL

Lieutenant Colonel Harold R. Hennessy, MC, AUS, now in Germany and formerly with the California State Health Department in county health work, has been awarded the Bronze Star Medal "for meritorious service in connection with military operations against the enemy . . . in Belgium and Germany. As Public Health Officer in the Office of the Army Surgeon, Lieutenant Colonel Hennessy demonstrated outstanding qualities of leadership by organizing and directing the public health control of displaced persons, refugees, and the German civil population in the Rhineprovinz military district. Through his personal efforts the spread of typhus fever throughout the Army area was halted in a remarkably short time, thus averting a critical problem. Colonel Hennessy's reliability, aggressiveness and tactful nature reflect great credit upon himself and the Armed Forces of the United States."

FEDERAL INTER-AGENCY COMMITTEE ON SCHOOL HEALTH

The U. S. Commissioner of Education, J. W. Studebaker, has announced that the Office of Education expects to aid in every way the development and improvement of the program of health and physical education in the schools. According to Dr. Studebaker, the Office has sponsored the formation of a Federal Inter-Agency Committee to plan coöperatively the activity of the federal government in school health, including the existing programs and the planning for extension of these programs. The committee will consist of one representative from the U. S. Office of Education, one from the Public Health Service, and one from the Children's Bureau. This committee will serve as a coördinating group to help plan health programs to meet the needs of the school-age child and to eliminate duplication of effort. Dr. Studebaker states that funds have not been appropriated for the current fiscal year for the continuation of the National Committee on Physical Fitness.

AMERICAN COMMITTEE ON MATERNAL WELFARE SEEKS RELEASE OF OBSTETRICIANS AND GYNECOLOGISTS

Fred L. Adair, M.D., Chairman of the American Committee on Maternal Welfare, Inc., Chicago, has written President Harry S. Truman and the officials of the War and Navy Departments and of Congress urging the prompt release to civilian practice of qualified specialists in obstetrics and gynecology who are now serving with the armed forces. According to Dr. Adair, there is an acute need both for those qualified as specialists who are already established in practice and those on their way to specialized status whose careers have been cut short by the call to service. He points out that the practice of obstetrics and gynecology is essentially a civilian service and that the care of mothers and women has been seriously curtailed. It is maintained that failure to release these officers to civilian life promptly will seriously hamper existing services and educational facilities, as well as the progress of plans designed for the future welfare of mothers, new-born infants, and women.

AMERICA TYPHUS COMMISSON MEDAL AWARDED DR. MAXCY AND DR. BLAKE

The United States of America Typhus Commission Medal was awarded at the Office of The Surgeon General on September 10 to Dr. Kenneth F. Maxcy, Professor of Epidemiology at Johns

Hopkins School of Hygiene and Public Health, and Dr. Francis G. Blake, Dean of Yale University School of Medicine, for "exceptionally meritorious service." Both Dr. Maxcy and Dr. Blake, in addition to their other duties, are consultants to the Secretary of War.

The awards were presented by Major General George F. Lull, Deputy Surgeon General of the Army. Dr. Maxcy was commended for "his observations made in the field under difficult campaign conditions, which clarified earlier knowledge of the conditions under which scrub typhus occurs and added greatly to information about the special conditions which were making this disease a health hazard of paramount importance to American troops."

The citation accompanying the award to Dr. Blake said in part: "Dr. Blake initiated and directed investigations of classical importance on the clinical features and prevention of scrub typhus. He made new contributions to the knowledge and control of a form of typhus fever of great military and civilian importance. His wisdom, energy, and special competence assured the success of this mission and laid the basis for enduring benefits."

The Typhus Commission medal, which was authorized by President Roosevelt, is regarded as a high honor in this field of science. Only about thirty men have been awarded it to date.

GRADUATE COURSE IN INDUSTRIAL MEDICINE AT LONG ISLAND

The Long Island College of Medicine, Brooklyn, N. Y., has announced the presentation of the fourth graduate course in industrial medicine, January 14 to February 1, 1946. Afternoon and evening seminars and morning clinics devoted to intensive orientation in industrial medical administration, internal medicine in industry, the occupational diseases, and industrial surgery will make up the course. Inquiries should be addressed to the Department of Preventive Medicine and Community Health, 248 Baltic St., Brooklyn 2, N. Y.

NORTH DAKOTA STATE DEPARTMENT OF HEALTH NEW STAFF APPOINTMENTS

Three staff appointments to the North Dakota State Department of Health have been made by Dr. G. F. Campana, State Health Officer. Bernardine Cervinski will be director of Health Education; Fred J. Baker has been assigned as chemist in the Public Health Laboratory at Bismarck; and Richard M. Ludemann will be lay venereal disease investigator for the division of Preventable Diseases. Dr. Campana also announces that Irene M. Donovan, Director of Public Health Nursing, has resumed her duties after an educational leave spent at the University of Minnesota.

STUDENT HEALTH ACTIVITIES

New student health service buildings are being planned for the University of Alabama, University; University of Colorado, Boulder; Connecticut College, New London; University of Delaware, Newark; and the University of British Columbia.

DR. STEBBINS APPOINTED TO JOHNS HOPKINS FACULTY

The appointment of Ernest Lyman Stebbins, M.D., M.P.H., Commissioner of Health of New York City, as Professor of Public Health Administration in the School of Hygiene and Public Health, Johns Hopkins University, was announced on October 21 in Baltimore. Dr. Stebbins will succeed Allen W. Freeman, M.D., presently Professor of Public Health Administration in the School, who will retire in June 1946. Dr. Stebbins will also become Assistant Director of the school and will succeed Lowell J. Reed, Ph.D., the present

Director, at the expiration of his term.

Dr. Stebbins, who has served for more than three years in his present post, is on leave as Professor of Epidemiology at the School of Public Health, Columbia University, New York City. He is expected to assume his new appointments by July 1, 1946.

TEXAS CRIPPLED CHILDREN SERVICES

The transfer of the responsibility for administration of the Texas Program of Services to Crippled Children from the State Department of Education to the State Department of Health was recently authorized.

PERSONALS

Central States

RUTH EVELYN BOYNTON, M.D.,† Minneapolis, was recently elected President of the Minnesota Department of Health.

DAVID E. ELLISON, M.D., has resigned as Venereal Disease Control Officer of the Minneapolis Department of Health, effective September 1.

HENRIETTA M. HERBOLSHEIMER, M.D.,† Acting Chief of the Division of Maternal and Child Hygiene, State Department of Health, Springfield, Ill., has been named Secretary of an Executive Committee to conduct a survey of Illinois hospital facilities. Newspapers report that the group will operate under authority of an advisory council appointed by Governor Green to determine hospital needs throughout the state.

LAWRENCE J. LINCK,† Chicago, Ill., has resigned as Director of the Syphilis Control Project of the Chicago Board of Health to become Executive Director of the National Society for Crippled Children and Adults, Inc., which has moved its offices to Chicago.

SAMUEL N. MALLISON, M.D.,† has resigned as Superintendent of Health of Decatur, Ill., effective August 1, to join the State Department of Health as District No. 6 Health Officer with headquarters in Champaign. He will be in charge of the district including Livingston, Kankakee, Ford, Iroquois, and Vermilion Counties.

HERMAN G. MORGAN, M.D., was recently appointed Secretary of the newly created Indianapolis Board of Health and Hospitals and Director of Public Health. The Board was established by the last legislature and supplants two separate boards. Other appointees include DRS. CHARLES W. MYERS, Director of Hospitals; KENNETH G. KOHLSTAEDT, Medical Director of the Indianapolis City Hospital; JAMES D. PEIRCE, JR., Assistant Director of the hospital, and GERALD F. KEMPF, Superintendent of Preventive Medicine.

Eastern States

G. DONALD BUCKNER,† Worcester, Mass., has resigned as Executive Secretary of the Southern Worcester County Health Association to become Secretary of the Tuberculosis Committee of the New York Tuberculosis and Health Association, New York, N. Y., effective October 1.

VIVIAN DRENCKHAHN † has joined the staff of the National Tuberculosis Association, New York, N. Y., as Associate in Health Education on October 1. During the past three years, Miss Drenckhahn has been in government service, first detailed to the U. S. Office of Education as Senior Specialist in Nutrition, and later serving as field consultant in southwestern states for the Nutrition Programs Branch, War Food Administration.

HAZEL A. HART,† New York, N. Y., has resigned as Director of Recruiting, Training and Placement of the State Committee on Tuberculosis and Public Health, State Charities Aid

Association, to become Director of Seal Sale for Canada for the Canadian Tuberculosis Association with headquarters in Ottawa.

WILLIAM C. INMAN, M.D., of Danvers, Mass., has been appointed Director of the Division of Mental Hygiene and Research of the Massachusetts State Department of Mental Health.

HERBERT R. KOBES, M.D.,† Director of Medical Services, Maine Department of Health and Welfare, Augusta, Me., has been appointed Director of the Division of Services for Crippled Children of the University of Illinois, with central offices in Springfield, Ill. He succeeds LAWRENCE J. LINCK,† who recently resigned to become Executive Director of the National Society for Crippled Children.

EDWIN J. MACEWAN'S appointment as Administrative Director of the American Cancer Society was announced by ELMER H. BOBST, Chairman of the Executive Committee of the Board. The office is newly created and carries full responsibility for the business management of the cancer organization which is national in scope with affiliates in virtually every state in the nation. It becomes effective October 15.

JOHN OBERWAGER, M.D.,* who for many years has served as Director of the Sanitary Bureau, New York City Department of Health, has been transferred to become the Director of the Division of Health Education in the Department, succeeding SAVEL ZIMAND,* resigned.

ELMER H. STOTZ, M.D., has been named head of the new Division of Food Science and Technology that has been established at the New York State Experiment Station at Geneva by merging the Divisions of Bacteriology and Chemistry. The work of the group is to be guided by a committee consisting of members of the former divisions. This committee will consist of DR. STOTZ, who was head of the Division of Chemistry, Chairman; DR. GEORGE J. HUCKER* and DR. CARL S. PEDERSON,* Professors of Bacteriology; and DR. ZOLTAN I. KERTESZ, Professor of Chemistry.

LIEUT. COL. HARRY W. WEEST, JR., formerly Chief Surgeon of the 28th Division, has been appointed Secretary of Health of Pennsylvania to succeed DR. ALEXANDER H. STEWART,† Harrisburg, who died July 31.

DOROTHY WORTHINGTON, M.D.,* White Plains, N. Y., has resigned as Director of the Division of Maternal and Child Health, Westchester County Department of Health, to take up the private practice of pediatrics in White Plains.

SAVEL ZIMAND,* New York, N. Y., has resigned as the Director of the Bureau of Health Education in the New York City Department of Health to accept appointment as Executive Director of the New York City Cancer Committee, effective October 1.

Southern States

EDMOND J. BRYSON, M.D., Liberty, S. C., who has been serving as Health Officer for Oconee and Pickens Counties, has been assigned Health Officer for Pickens County only, and DR. FURMAN T. SIMPSON, Westminster, will have charge of the Oconee Unit.

VICTOR F. CULLEN, M.D., of State Sanatorium, Md., was recently chosen President-Elect of the National Tuberculosis Association and WILL ROSS, Milwaukee, Wisc., was installed as President, for the 1945–1946 term.

FREDERICK G. GILLICK, M.D.,† has resigned as Chief of the Bureau of Venereal Disease in the District of Columbia Health Department to re-

* Fellow A.P.H.A.
† Member A.P.H.A.

sume work with the U. S. Public Health Service.

CHANGES IN HEALTH OFFICERS IN NORTH CAROLINA

ALFRED MORDECAI, M.D., has been appointed Health Officer for the newly created Health Department for Davie, Yadkin, and Stokes Counties, with headquarters in Winston-Salem.

GILCIN F. MEADORS, JR., M.D.,† has resigned as Health Officer of Lenoir County to report to the States Relation Division of the U. S. Public Health Service, Washington, D. C., effective August 10.

HAMILTON W. STEVENS, M.D., Jacksonville, Director of the Onslow-Pender District Health Department, has resigned, effective September 30, to become Director of the Wilson City and County Health Unit.

WILSON T. SOWDER, M.D.,† of the U. S. Public Health Service, has been appointed Health Officer of Florida to succeed HENRY HANSON, M.D.,* Jacksonville, who retired Sept. 25.

S. EDWARD SULKIN, PH.D.,* has been promoted to a Professorship of Bacteriology and Immunology and has been made Chairman of the Department at the Southwestern Medical College, Dallas, Tex.

CHANGES IN HEALTH OFFICERS IN WEST VIRGINIA

At a special meeting of the Public Health Council in August, the following city and county health officers were appointed:

JAMES E. COLEMAN, M.D. (reappointed), Fayetteville, of Fayette County;

EDGAR H. WILLARD, M.D., Berkeley Springs, of Morgan County;

ROSCOE G. STOTTS, M.D., of Kenova;

JAMES A. MCCLUNG, M.D.,† of Richwood.

Western States

SAMUEL D. ALLISON, M.D.,* for more than three years Control Officer of the Division of Venereal Diseases in the Board of Health, Territory of Hawaii, has been given a temporary appointment of Director of Public Health during the absence of DR. RICHARD K. C. LEE,† Honolulu, who has been given a year's leave for graduate study in New York.

WILL H. AUFRANC, M.D.,* a regular corps officer, of the U. S. Public Health Service with rank of Surgeon, is on loan to the state of Oregon to act as Assistant State Health Officer. Dr. Aufranc also has charge of the County Health Units Program as well as the State Venereal Disease Control Program.

ELIZABETH BISHOP, M.D.,† of Baker, Ore., Health Officer of Union and Baker Counties, was recently elected President of the Oregon Public Health Association.

HUGH DIERKER, M.D., M.P.H.,† has resigned from the position of Chief of the Division of Industrial Hygiene for the Los Angeles County Health Department to assume the duties of Medical Director of the Southern California Division of General Motors Corporation in South Gate, Calif.

NIELS A. KAA, M.D., of Corvallis, Mont., has been appointed Health Officer of Ravalli County.

Canada

JOHN D. HAMILTON, M.D.,† of Montreal, P. Q., has been discharged from the Royal Canadian Army Medical Corps where he served as Major with the No. 1 Research Laboratory of the Canadian Army, to assume the position of Assistant Professor of Pathology at the University of McGill, Montreal, Canada.

* Fellow A.P.H.A.
† Member A.P.H.A.